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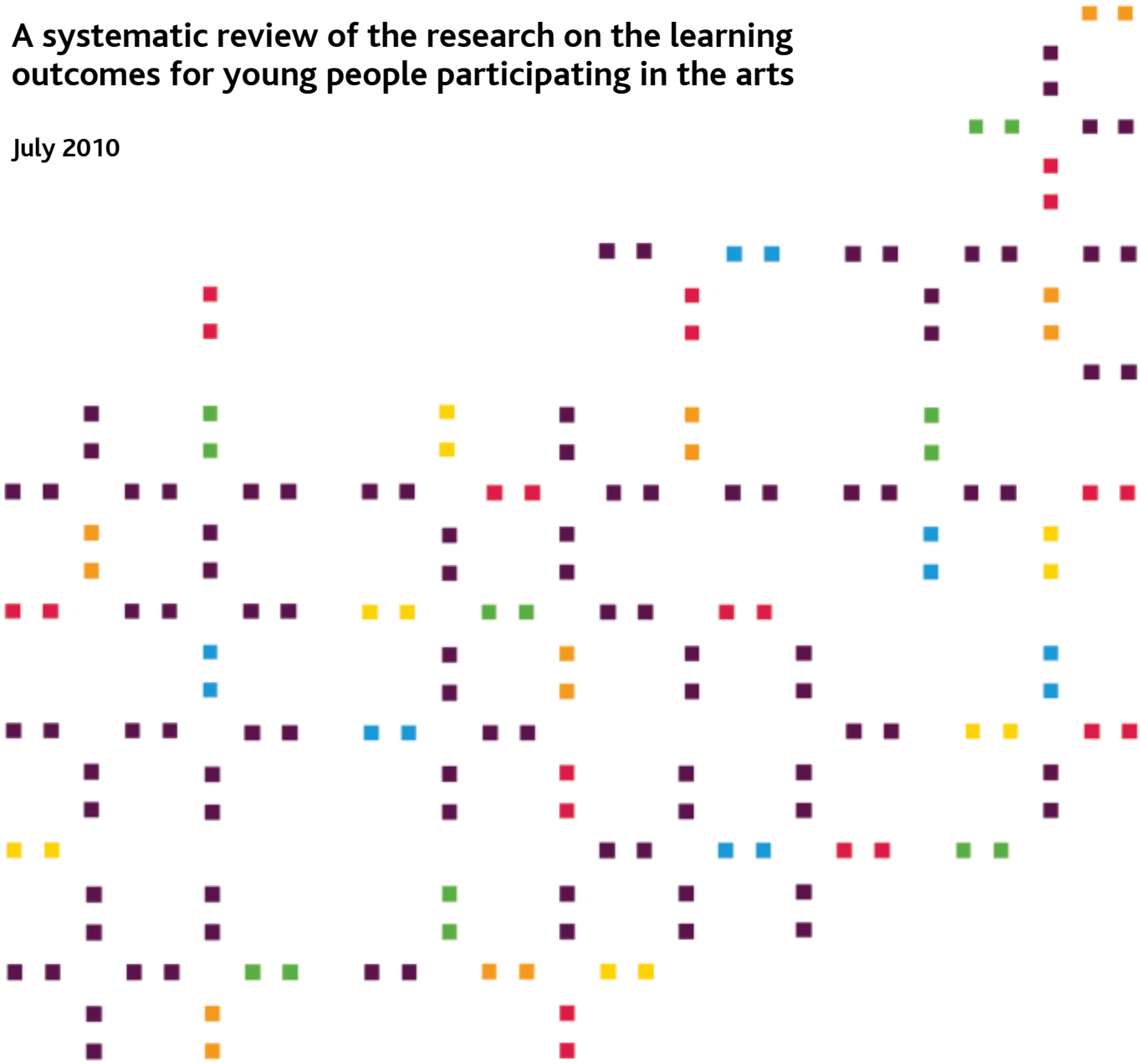
case: the culture and sport evidence programme

Understanding the impact of engagement in culture and sport

A systematic review of the research on the learning outcomes for young people participating in the arts

July 2010



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The work on this project was carried out by a consortium led by the EPPI centre with Matrix Knowledge Group

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This report can be downloaded from the Arts Council website:
www.artscouncil.org.uk

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Contents

List of abbreviations

ACE	Arts Council England
BME	Black and minority ethnic
CASE	Culture and Sport Evidence
CaSE-F	Culture and Sport Engagement Framework
CAT	Canadian Achievement Test
CI	Confidence Interval
DCMS	Department for Culture, Media and Sport
EH	English Heritage
GCSE	General Certificate of Secondary Education
KS	Key Stage
MSMS	Maryland Scientific Methods Scale
MLA	Museums, Libraries and Archives Council
NPD	National Pupil Database
NDPBs	Non-departmental public bodies
SATs	Standard Assessment Tests
SE	Sport England
SES	Socioeconomic status
WoE	Weight of Evidence

Abstract

What do we want to know?

What impact does young people's participation in the arts have on their learning, achievement and skills?

Who wants to know and why?

It is widely believed that participation in the arts has a range of benefits for young people. Policy-makers wish to understand more about the nature and quantity of such benefits in order to make better decisions about how to make further investment in the arts.

What did we find?

When compared to non-participation in structured arts activities, participation in structured arts activities improves:

- secondary school students' academic attainment
- pre-school and primary students' early literacy skills
- young people's cognitive abilities (based on various measures of intelligence)
- young people's transferable skills.

There is promising, yet insufficient, evidence that participation in arts activities improves primary school aged children's academic attainment**.**

These findings are based on 24 'high quality' studies conducted in North America, Europe or Asia. Study populations included young people within the age range of 3-16 years.

What are the implications?

In most instances, the number of studies that addressed each of the specific sub-questions was small. Any consideration of policy responses will need to take into account a wide range of other knowledge about policy and practice, other benefits that might be obtained from participation in arts, and the potential for other mechanisms to deliver these outcomes and costs.

The size of the impacts identified could be interpreted as follows:

- The participation of young people of secondary school age in structured arts activities could increase their academic attainment scores by 1% to 2%, on average, above that of non-participants (all other things being equal).
- The participation of young people in structured arts activities could increase their cognitive abilities test scores by 16% to 19%, on average, above that of non-participants (all other things being equal).
- The participation of young people in structured arts activities could increase their transferable skills test scores by 10% to 17%, on average, above that of non-participants (all other things being equal).

How did we get these results?

We carried out a systematic review of empirical research on engagement, impact and value in culture and sport published in English since 1997. A comprehensive search strategy was used to identify studies and a combination of manual and automated screening was used to select studies for inclusion based on pre-specified inclusion criteria. To be included in this in-depth review, studies had to focus on arts participation by young people, use a high quality experimental research design and have quantitative outcome measures. Results from the individual studies were transformed into a standardised effect size and, where appropriate, meta-analysis was used to combine the results from individual studies. Implications about the interpretation of the results of the synthesis were derived using a standardised framework.

1. **Background**

The Culture and Sport Evidence (CASE) programme was set up by the Department for Culture, Media and Sport (DCMS) in 2008, in collaboration with the sector-leading non-departmental public bodies (NDPBs): Arts Council England (ACE), English Heritage (EH), Museums, Libraries and Archives Council (MLA) and Sport England (SE). The programme aims to generate strategic evidence that will be used to inform the deployment of public funds to maximise engagement in sport and culture, and the value citizens in England receive from that engagement.

As part of the CASE programme, DCMS commissioned the EPPI-Centre (Institute of Education, University of London) and Matrix Knowledge Group to undertake a research project to investigate the drivers, impact and value of engagement in culture and sport. The project used systematic review, analytical and statistical modelling techniques to begin to understand why people engage, or do not engage, in cultural and sporting activities, the benefits they obtain from that engagement, and the potential value to them, and to society as a whole. An overview of the approach and methods of this project can be found in Tripney et al. (2010).

1.1 Aims and rationale for the current systematic review

Empirical research on cultural and sporting engagement is extensive and wide ranging. Through a process of discussion and negotiation, the CASE Board agreed to focus the systematic reviews on a sub-section of this literature: young people's cultural and sporting engagement.

A set of systematic reviews were undertaken to examine the impact of young people's engagement (in each sector: sport, arts, MLA, heritage) on their learning. This systematic review aims to examine the impact of young people's participation in the arts.

1.2 Definitional and conceptual issues

This report examines a sub-section of the literature on cultural and sporting engagement: studies that use quantitative methods to examine the impact on young people's learning outcomes from participation in arts.

The following definitions are used in this review:

Young people: refers to anyone under the age of 19 years.

Learning outcomes: refers to the measurement of (but is not necessarily limited to) any of the following:

- academic achievement/skills (as measured by, for example, GCSE examinations or class test scores)
- transferable skills (for example, interpersonal/communication skills, social competency skills)
- cognitive abilities
- truancy rates/behaviour problems
- personal development
- cultural knowledge
- attitude to learning
- capacity or capability to learn/develop
- curiosity
- motivation for learning
- creativity.

Participation in structured arts activities refers to participation in organised arts activities guided by a teacher or other facilitator.

1.3 Research and policy background

Recent government policies have emphasised the value of maximising the public's engagement in culture and sport and demonstrated a commitment to increasing access to these sectors. This is evident in both national and regional strategies (e.g., *Every Child Matters; A Passion for Excellence*) and across government departments (e.g., *Sea Change; London 2012 Olympic Legacy Action Plan*; *National School Sport Strategy*). Funded bodies are similarly placing great emphasis on increasing and sustaining participation in culture and sport (e.g., English Heritage's *A Lasting Legacy;* the Arts Council's *Great Art for Everyone*). The current political climate, strengthened by recommendations from the McMaster Review (2008) and recent events (e.g., Liverpool Capital of Culture 2008; preparations for the 2012 Olympics), provides a genuine opportunity for maximising public engagement with culture and sport.

The evidence base for engagement in culture and sport has been reviewed by numerous authors, including projects commissioned by the Department for Culture, Media and Sport (e.g., Daly, 2005; Evans and Shaw, 2004; Freshminds, 2007) and the Scottish Executive (e.g., Galloway et al., 2006; Ruiz, 2004). In the literature, many claims have been made about the impact of the culture and sports sectors on a diverse range of outcomes. These claims, however, are based on a variety of types of knowledge/evidence, and reviews of such knowledge/evidence, having been prepared for different purposes for different audiences, are not consistent in their approach to gathering, selecting, analysing or quantifying the evidence they present. To date, there has not been a comprehensive, systematic, consistent cross-sectoral analysis of the impacts of culture and sport.

In England, Arts Council England (ACE) is the national development agency for the arts, distributing public money from the government and the National Lottery. Between 2008 and 2011, investments will be in excess of £1.6 billion. ACE is accountable to the government and the wider public for the effective use of this public money. As such, it is challenged with understanding the values and benefits that such investments accrue to individuals, communities and society, and with using that understanding to make decisions about the best use of its resources. As part of a commitment to strengthening the existing evidence base on the impact of the arts, Arts Council England and its equivalent in Scotland, the Scottish Arts Council, have funded a number of literature reviews in this area (Arts Council England, 2004; Galloway, 2008; Reeves, 2002), including those looking at the issues of social exclusion and health (Jermyn, 2001, 2004; Staricoff, 2004). The empirical evidence for the impact of the arts has also been reviewed by Coalter (2001), Guetzkow (2002), McCarthy et al. (2001) and Newman et al. (2001), and in reviews examining the impact of arts participation in areas such as regeneration (Shaw, 1999), criminal justice (Hughes, 2005), education (Deasy, 2002; Mason et al., 2006; Standley, 2008; Winner and Cooper, 2000), social inclusion (Belfiore, 2002) and health (Angus, 2002; Daykin et al., 2008; Gold et al., 2004, 2009; Health Development Agency, 1999; White and Angus, 2003).

Reviews in the field of education have typically focused on children and young people. The contribution of art education to cultural learning in learners aged 5-16 has recently been the focus of a systematic review (Mason et al., 2006), as has the effects of music instruction on children's reading skills (Standley, 2008). There are two substantial surveys of research on the various learning effects of arts participation on children and young people, both conducted by researchers in the United States. To date, the most systematic and comprehensive synthesis in the field of arts education is the research conducted by the Reviewing Education and the Arts Project (REAP), published as a whole issue of the *Journal of Aesthetic Education* (Winner and Cooper, 2000). A total of 188 relevant studies carried out between 1950 and 1999 were identified and a set of 10 meta-analyses conducted. Around the same time, the Washington-based Arts Education Partnership produced a compendium of arts education research in which a qualitative commentary was presented on 62 studies (both qualitative and quantitative research) (Deasy, 2002). These reviews are now quite dated and more recent reviews are limited either by a focus on a specific sub-set of the arts and/or by type of study design.

Both in the UK and internationally, a great deal has also been written about the conceptual and methodological challenges in researching the impact of the arts. There currently remains much disagreement about the meaning of the term 'impact' and appropriate ways of measuring and evaluating it, with many writers questioning the applicability and practicality of the experimental approach for dealing with the complexity of arts impact (Belfiore and Bennett, 2007; Galloway, 2009; Jermyn 2004; Matarasso, 1997). It is argued by some that current methods for assessing the impact of the arts are largely based on a fragmented and incomplete understanding of the cognitive, psychological and socio-cultural dynamics that govern the aesthetic experience (Belfiore and Bennett, 2007).

Recent suggestions for alternative ways of understanding this topic include taking a historical-critical approach (Belfiore and Bennett, 2006) and the use of theory-based evaluation (Galloway, 2009).

1.4 Authors, funders, and other users of the review

The project was funded by the Culture and Sport Evidence (CASE) programme.[1] The CASE programme comprises the Department for Culture, Media and Sport (DCMS), Arts Council England (ACE), English Heritage (EH), Museums, Libraries and Archives Council (MLA) and Sport England (SE). The CASE Board is made up of the research directors and/or managers for each organisation, who acted as an Advisory Group.

The project was undertaken jointly by the EPPI-Centre, Social Science Research Unit, Institute of Education, University of London and Matrix Knowledge Group. The EPPI-Centre was responsible for the systematic review work.

1.5 Review question

The in-depth review reported here addressed one specific sub-question:

> What is the impact of young people's participation in structured arts activities on their learning outcomes?

[1] http://www.culture.gov.uk/case/case.html

2. Methods used in the review

2.1 General approach of the project

There is little agreement across the culture and sport sectors about what constitutes 'impact', how or whether impact can be measured, how best to do so and/or whether impacts demonstrated in one context can be generalised to another (Galloway, 2009). Whatever the different positions taken, the justification for any public policy on the topic is that engagement in 'culture or sport' is good for 'something' or 'somebody'. This is a causal claim, i.e., a claim that engagement with cultural or sporting activities produces an effect of some kind, whether it is immediate or long term, direct or indirect. The general approach adopted by this project followed this logic. The in-depth reviews that were undertaken (one of which is described in this report)[2] examined research that measured impacts quantitatively and attempted to establish cause and effect relationships between cultural/sporting engagement and an outcome. Decisions about which study designs were appropriate for measuring impact, and methods for assessing quality, were made with the CASE Board.

2.2 User involvement

The Advisory Group, composed of CASE Board members and other relevant stakeholders, played a central role in establishing the conceptual scope of the review outlined in section 1.2. CASE Board members also decided the focus of the in-depth review questions.

2.3 Type of review

This project used systematic review methods to examine the cultural/sporting literature. This approach differs from traditional literature reviews or narrative accounts by using an explicit method to identify, describe and appraise the research studies. A full report of the methods used in the systematic review process can be found in '*Understanding the drivers, impact and value of engagement in culture and sport: technical report for the systematic review and database*' published on the CASE website. The systematic review used standard procedures and processes developed by the EPPI-Centre, as summarised in Appendix 1.

The review was carried out in three stages[3]:

- Stage one: creating a repository (database) of studies.

  The first stage of the review consisted of identifying all research evidence about engagement in culture and sport. It produced a searchable database that is publicly available.

- Stage two: mapping exercise

The second stage of the review involved describing (or mapping) a sub-section of the wider literature included in the database created at stage one. The subsection was defined as high quality quantitative studies of impact. High quality studies were defined as those that had a control group and where, in the absence of random allocation to groups, both pre-test and post-test measurements of the outcome of interest were taken. As there were few high quality studies in the MLA and/or heritage sectors, for these two sectors all quantitative impact studies were mapped. Relevant studies were identified and methodological and contextual information was collected. This information provided a basis for informed discussion and decision-making between the research team and the CASE Board about the focus of stage three.

- Stage three: in-depth review

The third stage involved an in-depth analysis of a sub-section of the studies mapped in the second stage focusing on impact of learning outcomes for children and young people.

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[2] See '*Understanding the impact of engagement in culture and sport: a systematic review of the research on learning outcomes for young people'* published on the CASE website (www.culture.gov.uk/case).

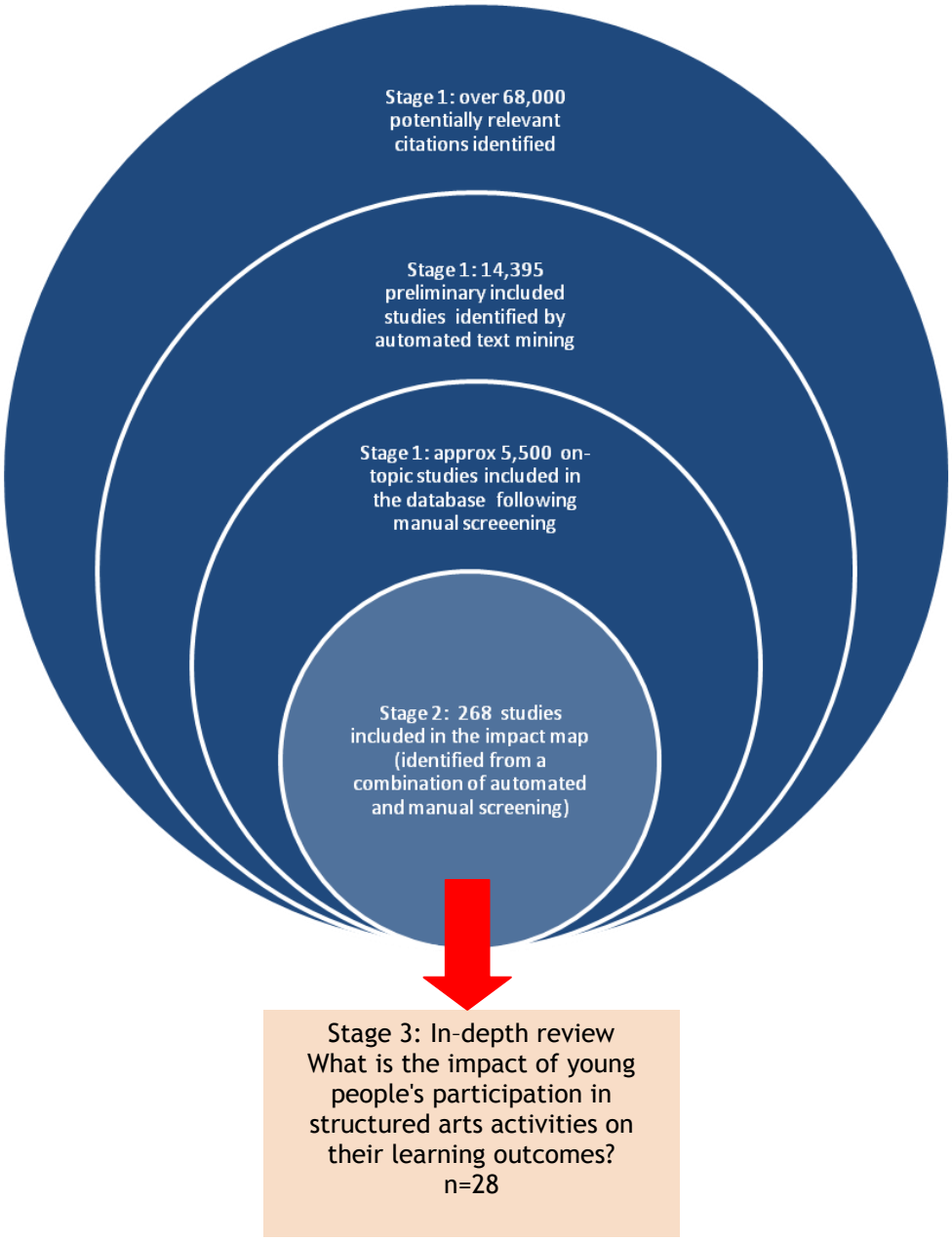
[3] These did not necessarily run sequentially.

Detailed data extraction and quality assessment of the included studies was undertaken and the findings synthesised in order to provide answers to the in-depth review question.

2.4 Identifying and selecting studies

A broad and comprehensive search strategy was used to identify research studies on engagement, impact and value in sport, the arts, heritage, museums, galleries, libraries and archives. This generated a very large pool of potentially relevant studies (n=68,434), so text mining software was used to support the process of selection. An overview of the flow of studies through the review is shown in Figure 2.1.

Figure 2.1: Summary of the flow of studies through the different stages of the review process



Inclusion criteria were developed and applied at each stage of the review process (see Appendix 2). This in-depth review of research on learning outcomes for young people participating in the arts includes only those studies judged to be high quality (see section 2.3).

The review technical report (Tripney et al. 2010) provides a fuller explanation of the process of assessing the quality of studies.

2.5 Synthesis

Meta-analytic techniques were used to synthesise the findings from included studies. Each study was subject to an in-depth data extraction, where information about the context, methods and findings were recorded and a quality assessment was carried out (see Appendix 4). The main aim of the synthesis was to combine results (where appropriate) across studies, therefore we used data that could be translated into a common metric of effect sizes (Hedges' g). Most studies reported multiple learning outcomes; where possible, effect sizes were calculated for all outcomes (see Appendix 6 for details of those calculated for each study).

This in-depth review includes multiple meta-analyses, each of which addresses a particular sub-question. Studies have been grouped according to different types of learning outcome and/or age of participants. For each sub-question, the effect sizes from each relevant study were entered into the meta-analysis to generate an overall pooled estimate of effect. Only one outcome from each study was included in any single meta-analysis (to avoid the same participants' outcomes being counted twice). The individual and pooled effect sizes are displayed on a forest plot, which is a diagrammatic representation of the meta-analysis (see Appendix 3 for an explanation of how to read a forest plot and Tripney et al. (2010) for further explanation).

A minimum of two studies is necessary for a synthesis. Where there was only one study investigating a particular sub-question, brief details about that study have been reported.

2.6 Drawing conclusions

An adapted version of the Maryland Scientific Methods Scale interpretation framework was used by the review team to interpret the results of the synthesis (Farrington et al., 2002). Details of the framework can be found in Appendix 5. To illustrate the potential impact of participating in arts activities, the pooled effect sizes were transformed into hypothetical changes in relevant test scores (Coe, 2002).

3. What were the findings of the studies?

3.1 Descriptive overview of the studies

Twenty-eight studies included for in-depth analysis were data extracted and their quality assessed. Of these, four studies were rated Low or Low/Medium overall weight of evidence and so were not eligible for inclusion in the synthesis (see Section 2.3 for specification ofg medium/high quality studies).

Of the remaining 24 studies, 15 studies were carried out in the USA, four in Canada, two in Asia (Korea, Hong Kong), one in Germany and two in the UK. The age range of participants, across all studies, was 3 to 16 years. In 21 studies, the participants were mixed sex and in one study there were only male participants (in the remaining two studies this information was not stated). Six studies were rated Medium/High overall weight of evidence and eighteen studies were rated Medium. Descriptive summaries for each of the individual studies, including a brief summary of the characteristics of the arts-based intervention, are provided in Appendix 7. The results (in the form of the effect sizes calculated for each outcome) can be found in Appendix 6.

The 24 studies included in the synthesis investigated the impact of participating in arts activities on young people's learning outcomes.[4] Of these, three studies measured the impact of arts participation on academic attainment in different subjects (as measured by standardised examinations or tests). Five studies measured the impact on the development of children's early literacy skills (for example, phonological awareness). Eight studies measured changes to children's cognitive skills, and eight studies examined the effect on transferable skills, such as communication skills, social skills and creativity.[5] A single study investigated whether participation in arts activities improved students' responses to bullying situations and a further single study investigated the impact of an arts activity on pupils' self-protective skills.

3.2 Does participation in structured arts activities improve academic attainment?

3.2.1 Overall description of studies

Three studies (two conducted in the UK and one in Canada) investigated the impact of participating in arts activities on academic attainment. Two studies were rated as Medium/High quality (Costa-Giomi, 2004; Kendall et al., 2008) and one was rated as Medium (Fleming et al., 2004). One study included primary and secondary school aged pupils (Kendall et al., 2008) and the other two focused only on primary school children. The families of the children selected to participate in the study by Costa-Giomi (2004) were described as having lower incomes than the typical piano student; a relatively high proportion were single-parent families. The intervention in the study by Kendall et al. (2008) focuses on young people in the most disadvantaged communities in England (where it can be assumed that participants have a different socio-economic profile from young people generally). In the study conducted by Fleming et al. (2004), the primary schools were in the East End of London (Borough of Tower Hamlets) and a large number of the pupils were learning English as a second language.

Fleming et al. (2004) used assessments developed by the Performance Indicators in Primary School (PIPS) project based at Durham. These assessments were based on the National Curriculum and widely used by schools across England. The Canadian study by Costa-Giomi (2004) used the Canadian Achievement Test 2 (CAT2). The UK study by Kendall et al. (2008) used national assessment results (SATs and/or GCSEs) for young people reaching the end of Key Stages 2, 3 and 4.

The study by Fleming et al. (2004) examined the impact of the National Theatre's Transformation drama project, which involved attendance/participation in drama activities (writing and performing plays). Kendall and colleagues at the National Foundation for Educational Research (2008) conducted an evaluation of Creative Partnerships, the national creative learning programme in England, designed to develop the skills of children and young

[4] Some interventions incorporated attendance at arts-based events.

[5] Other outcomes may have been reported, but they may not have been relevant to the review (e.g., post-test only) or it may have not been possible to calculate an effect size.

people across England through partnerships between schools and creative professionals.[6] The study by Costa-Giomi (2004) investigated the effects of piano instruction on children's development.

All three studies reported the impact of participating in arts activities on attainment in mathematics and in literacy/English. The study by Kendall et al. (2008) also measured the impact of Creative Partnerships on attainment in science, and in terms of 'best 8' GCSE scores and overall point scores at GCSE and Key Stages 2 and 3. Further information about this study is presented in Box 3.1.

Initial analysis indicated that the primary and secondary school aged studies were insufficiently similar to combine and thus the synthesis of studies was carried out separately for each group.

Box 3.1: Evaluation of Creative Partnerships (Kendall et al. (2008)

Creative Partnerships is the national creative learning programme in England, designed to develop the skills of young people, thereby raising their aspirations and achievements. Targeted at the most disadvantaged communities in England, the Creative Partnerships programme brings children and their teachers together with creative organisations and individuals to work in partnerships on creative projects.

The programme supports innovative, long-term partnerships between schools and creative professionals, including artists, performers, architects, multimedia developers and scientists. These partnerships therefore lead to young people's participation in many different types of arts participation activities in different schools.

The study used a matched comparison group design and the National Pupil Database. End of Key Stage 2 and 3 test scores and GCSEs for young people who attended Creative Partnership activities were compared with a matched group of students who did not attend a Creative Partnerships school.[7]

3.2.2 Primary school aged students

All three studies measured outcomes for primary school children. Costa-Giomi (2004) found that students who had three years of weekly individual piano instruction had better language (*g*=0.48, 95%C.I 0.11 to 0.85) and mathematics skills (*g*=0.30. 95%C.I -0.05 to 0.7) than the comparison group of students who did not get this instruction.[8] Fleming et al. (2004) found that students who participated in the National Theatre's three-year drama project performed better at numeracy (*g*=0.83, 95%C.I 0.44 to 1.22) and reading (*g*=0.40, 95%C.I 0.02 to 0.78) than a comparable group of students who did not participate. Kendall et al. (2008) found that, compared to similar young people nationally, primary school students who participated in Creative Partnership activities achieved, on average, the same outcomes in Key Stage 2 tests as those who did not participate.

Each of the three studies has results that indicate that primary school aged students who participated in structured arts activities had higher academic attainment outcomes than those that did not. However, statistical analysis suggests that the results of the individual studies are too dissimilar to combine using meta-analysis. On balance, the results would suggest that although arts participation does lead to better outcomes in this age group, there is something about either the type of activity, participants, outcomes or study designs used that requires further investigation. For this reason, we interpret the evidence of impact for primary school

[6] http://www.creative-partnerships.com/

[7] Two of authors very generously clarified some issues in order that effect sizes could be calculated.

[8] The author's conclusion that piano instruction did not affect academic achievement in mathematics and language skills appears to have been based on the lack of statistical significance, although this is not entirely clear in the reporting. The use of different statistical techniques can produce different *p* values or confidence intervals, which are used by researchers as the basis for making a claim of statistical significance. The synthesis techniques used in this review do not rely on the statistical significance of any individual study; rather, they are focused on the overall pattern or summary of results.

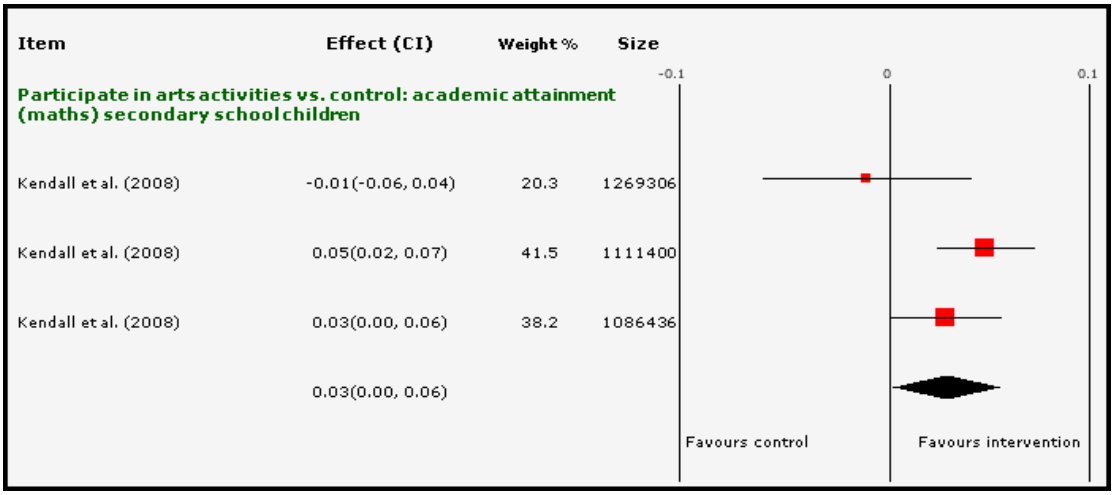
aged students as promising, rather than providing evidence that arts participation 'works' for this age group.

3.2.3 Secondary school age students

A single study (Kendall et al., 2008) reported academic outcomes for three different cohorts of secondary school pupils (thus is equivalent to three separate studies). The first cohort of students were those taking SATs at the end of Key Stage 3, the second cohort were students at the end of Key Stage 4 (taking GCSEs in the academic year 2003/4) and the third cohort took GCSEs in the academic year 2005/6.

The impact (for each of the three cohorts) of participating in arts activities on attainment in mathematics is presented in Figure 3.1, the impact on attainment in English in Figure 3.2 and the impact on attainment in science in Figure 3.3.

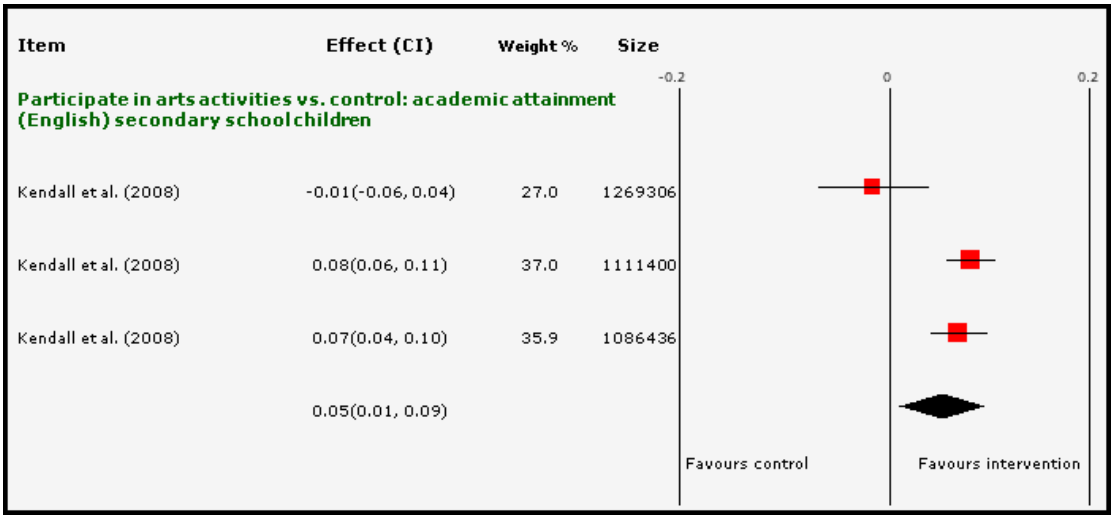
Figure 3.1: Forest plot illustrating the impact of participating in arts on attainment in mathematics at secondary school level



Heterogeneity statistic Q = 4.38 df = 2 p = 0.112 I^2 = 54.3%, Q* = 2.34; Meta analysis method random effects model

For both mathematics (Figure 3.1) and English (Figure 3.2) the statistical analysis of heterogeneity indicates considerable difference between these outcomes. However, the difference in the point estimates of effect between each cohort is in total less than *g*=0.1, as are the width of the 95% confidence intervals for each outcome. Furthermore, the total sample sizes are extremely large (this is nearly all driven by the size of the control group, which was comparable pupils in all schools in England taken from the National Pupil Database). With sample sizes this large, even very small differences in the effect sizes between the individual studies will be statistically significant (i.e., suggests statistical heterogeneity). Therefore, we do not think this indicates 'real' systematic differences in the intervention, population characteristics or outcome measures in the different cohorts, but rather does reflect 'real' differences in impact between the different cohorts. Thus, we argue that the pooled estimate of effect can be accepted as a valid estimate of the impact of this intervention on mathematics and English attainment.

Figure 3.2: Forest plot illustrating the impact of participating in arts on attainment in English at secondary school level

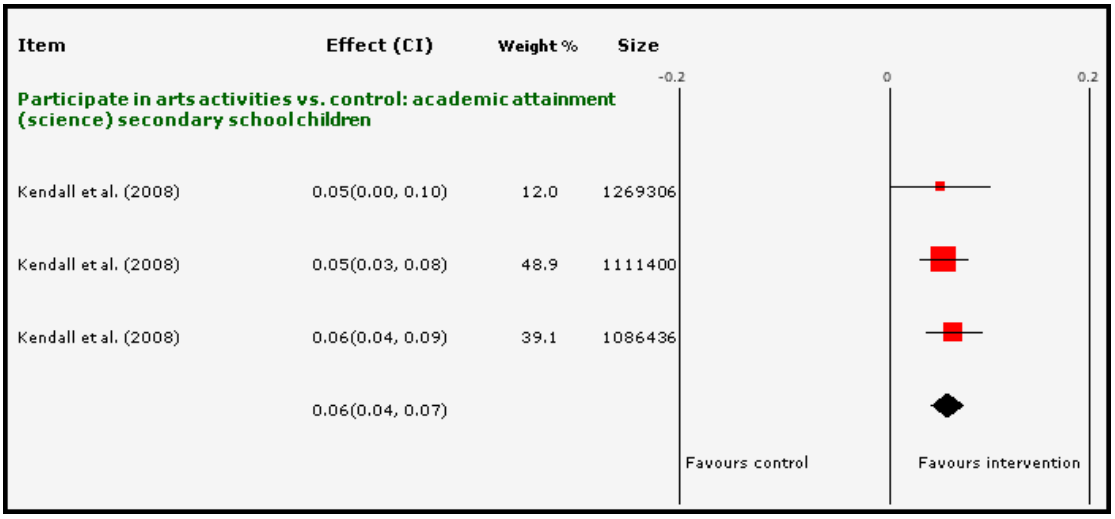


Heterogeneity statistic Q = 10.9 df = 2 p = 0.004 I^2 = 81.6%, Q* = 3.12; Meta analysis method random effects model

The effect sizes for mathematics and English in the initial Key Stage 4/GCSE cohort (2003/4) were negative (i.e., those who did not participate did better than those who did). It is not clear why this should be the case, but it may be important to investigate further whether there were any systematic changes to the Creative Partnerships programme between the earlier and later cohorts that would need to be replicated for the same results to be obtained.

For science, the pooled estimate of effect (*g*=0.06) indicates that the groups that participated in arts activities made greater improvements in academic attainment than those that did not participate in such activities.

Figure 3.3: Forest plot illustrating the impact of participating in arts on attainment in science at secondary school level



Heterogeneity statistic Q = 0.364 df = 2 p = 0.834 I^2 = 0%, Q* = 0.364; Meta analysis method: random effects model

The overall pooled estimates of effect for all three meta-analyses (as shown in Figures 3.1, 3.2 and 3.3) suggest that the Creative Partnerships programme did lead to increases in academic attainment for those who participated in the scheme. The study was rated Medium/High quality and thus we can be reasonably confident that the differences in progress between the intervention and control groups are valid indicators of the impact of the Creative

Partnerships programme. However, although the three cohorts[9] are different students, the same students are compared on each of the three subjects (mathematics, English and science). The better results found for those students taking part in Creative Partnerships across all three subjects may suggest that participation in structured arts projects leads to a general improvement in attainment rather than something subject specific.

It is difficult, however, to decipher the exact mechanism that produced this improvement in attainment, as the description of the Creative Partnerships scheme is not very detailed and it would appear that there was considerable scope for different activities under the umbrella of the Creative Partnerships programme, which may or may not be an important element of the programme's success.

3.3 Does participation in structured arts activities improve early literacy skills?

Five Medium quality studies conducted in the USA measured the impact of arts participation on the development of children's early literacy skills (Gromko, 2005; McMahon et al., 2003; Piro and Ortiz, 2009; Register, 2004; Standley and Hughes, 1997). The studies used different instruments to measure different aspects of early literacy. The studies by McMahon et al. (2003) and by Piro and Ortiz (2009) focused on children of primary school age (grades/years 1 and 2), while the remaining three studies considered impacts on younger children.

One study evaluated the effectiveness of an arts-based educational programme, 'Basic Reading Through Dance' (McMahon et al., 2003). Piro and Ortiz (2009) evaluated keyboard instruction. The remaining three studies evaluated multi-component music interventions that incorporated activities such as singing, playing instruments and movement (Gromko, 2005; Register, 2004; Standley and Hughes, 1997). In all five studies, the main goal of the intervention was to enhance early literacy skills (four studies focused on reading and one on writing). Each individual lesson therefore involved the fusion of both arts-based activities (music or dance) and literacy activities. An example of how these two different types of activities were combined in a single initiative is provided in Box 3.2.

Box 3.2: Evaluation of Basic Reading Through Dance (McMahon et al., 2003)

The 'Basic Reading Through Dance' programme was a curriculum-based reading intervention developed by Whirlwind, a not-for-profit organisation in the US. This arts-based educational programme had one general goal: to improve students' early-reading skills. Each session in the programme required students to use their bodies to physically represent the alphabet symbols for various sounds in the English language, as well as combinations of sounds. To physically represent each sound, students had to (a) visualise the appropriate symbols (letters) for spoken sounds and then (b) recreate these images physically using their bodies. Three trained artists implemented the programme, which was delivered in schools over 10 weeks (twice a week in 40-minute sessions).

The study used an unmatched comparison group design and participants in this study were first-grade students from Chicago public schools. The study examined the effects of the programme on reading skills, as assessed by different sub-tests of Read America's PhonoGraphix Test.

These five studies appear to evaluate similar interventions in the same age group. However, the instruments used vary, as does the vocabulary used by the study authors to describe the different outcomes they measure (see Table 3.1 for details). Whilst it is clear that these outcomes are all measures of a global phenomenon of 'early literacy', it is not clear whether the different instruments/outcomes are measuring the same or different sub-phenomena. Whilst it is possible to combine subsets of the studies that are not statistically heterogeneous, we do not find any of such combinations plausible or convincing. Therefore, we have not reported a pooled effect size for this group of studies. Narrative numerical synthesis using vote counting indicates that ten outcomes from five studies found that those students who participated in the interventions had better 'early literacy' performance scores than those who did not participate, and three outcomes were inconclusive. This compares to two outcomes

[9] Key Stage 3; Key Stage 4/GCSE: 2003/4; Key Stage 4/GCSE: 2005/6.

from two studies where those children who participated in the arts intervention had worse 'early literacy' performance scores than those who did not.

Table 3.1: Outcomes and effect sizes, multi-component arts interventions for early literacy

	Letter naming *g* (95%C.I)	**Phonemic tests *g* (95%C.I)**	**Other *g* (95%C.I)**
Gromko (2005)	0.1 (-0.3 to 0.5)	0.7 (0.3 to 1.1)	Nonsense word fluency -0.3 (-0.7 to 0.05)
McMahon et al. (2003)	Vowels 0.36 (0.2 to 0.52) Consonants 0.6 (0.43 to 0.75)	0.6 (0.4 to 0.8)	
Register (2004)	0.2 (-0.4 to 0.8)		Reading -0.2 (-0.8 to 0.4) Fluency 0.3 (-0.3 to 0.9)
Piro and Ortiz (2009)			Vocabulary 1.28 (0.85 to 1.7) Verbal sequencing 1.5 (1.1 to 2.0)
Standley and Hughes (1997)			Writing and language skills 0.9 (0.2 to 1.6)

3.4 Does participation in structured arts activities improve cognitive abilities?

Eight studies investigated the impact of participating in arts activities on cognitive abilities, five in the USA and three in Canada. Two studies were rated Medium/High quality (Costa-Giomi, 2004; Schellenberg, 2004) and six were rated Medium (Bilhartz et al., 1999; Gromko and Poorman, 1998; Orsmond and Miller, 1999; Rauscher et al., 1997; Rauscher and Zupan, 2000; von Rossberg-Gempton et al., 1999). Studies used a number of different standardised testing instruments. Two studies included primary school aged children (Costa-Giomi, 2004; von Rossberg-Gempton et al., 1999) and the remaining six studies focused on younger children.

One study evaluated the effectiveness of a creative dance programme (von Rossberg-Gempton et al., 1999). In the remaining seven studies, the type of arts activity was music. Two studies (Bilhartz et al., 1999; Gromko and Poorman, 1998) evaluated multi-component music interventions that incorporated activities such as singing, playing instruments and movement. Four studies investigated the impact of keyboard/piano instruction (Costa-Giomi, 2004; Rauscher et al., 1997; Rauscher and Zupan, 2000; Schellenberg, 2004), of which two conducted additional separate evaluations of the impact of singing on children's cognitive skills (Rauscher et al., 1997; Schellenberg, 2004). Orsmond and Miller (1999) evaluated the impact of a Suzuki music programme for classical music instruction. The study by Schellenberg (2004) also evaluated the effectiveness of drama lessons.[10]

Box 3.3: Evaluation of keyboard, voice and drama lessons (Schellenberg, 2004)

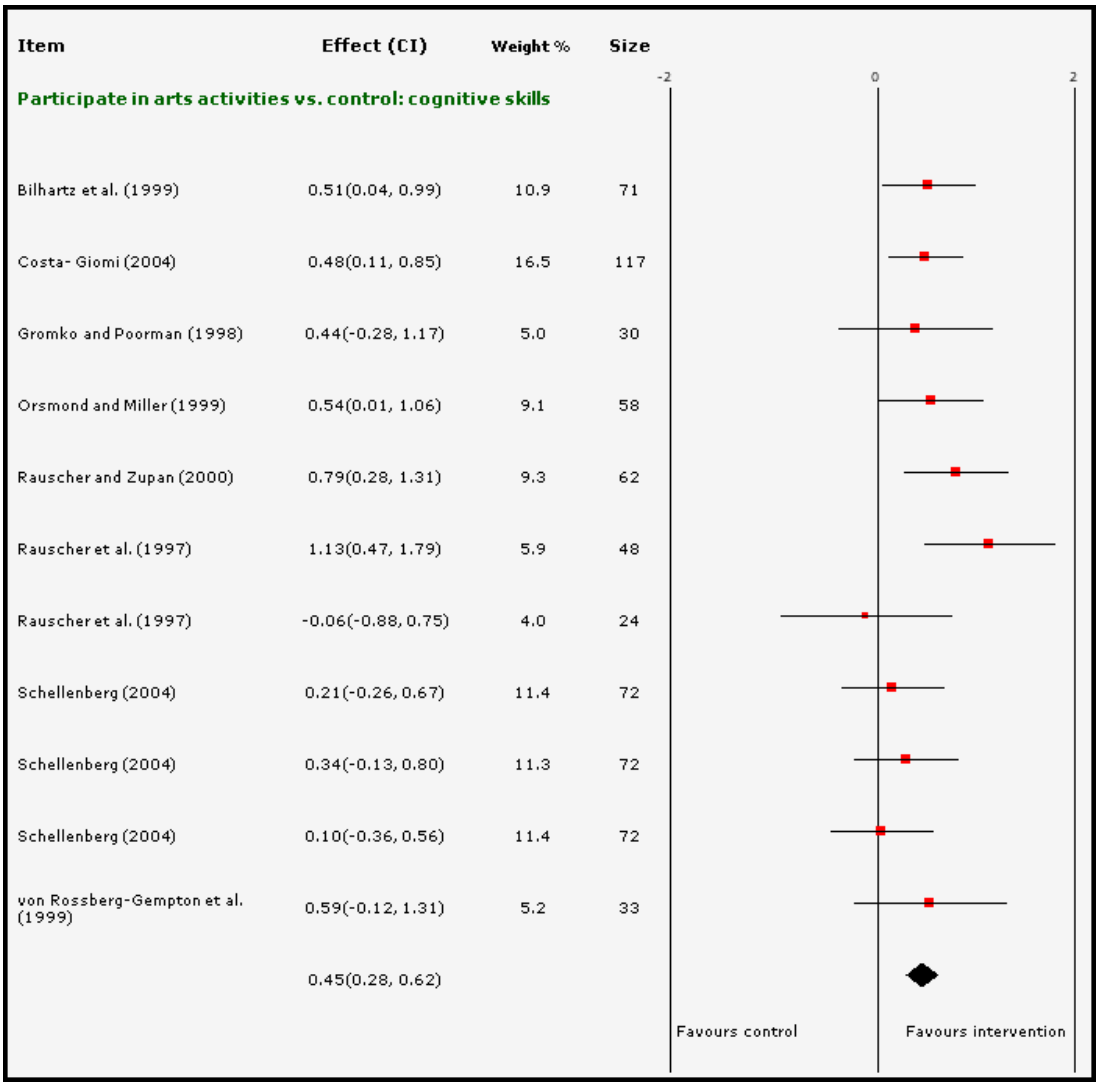
This study evaluated the effects of weekly arts lessons on children's IQ. The lessons were taught for 36 weeks at the Royal Conservatory of Music (Toronto, Canada). Lessons involved practice and rehearsal, memorisation, learning new scripts or pieces, expressing emotion, and so on.

[10] In the study, students participating in this activity served primarily as a control group.

The author reports that children were randomly allocated to one of four groups (36 children in each group): two groups received music lessons (keyboard or voice), one group received drama lessons and one group received no lessons. Participants were recruited at the age of six years. The author reported that six-year-olds were selected because children of this age are considered to be sufficiently mature for formal lessons, and because absolute (perfect) pitch is evident among individuals who begin taking music lessons before the age of seven.

Statistical analysis suggested that these studies are similar enough to combine using meta-analysis. Figure 3.4 shows a forest plot of the effect sizes for each individual study and the pooled estimate of effect. The pooled estimate suggests that young people who participated in arts activities made greater improvements in cognitive performance than the group that did not participate in such activities. The results also suggest that the size of effect may not be the same for all types of structured arts participation. However, this is complicated by the variation in the intensity and direction of the participation investigated in each study.

Figure 3.4: The impact of participating in arts on cognitive abilities



Heterogeneity statistic Q = 11 df = 10 p = 0.34 I^2 = 10.3%, Q* = 10.1; Meta analysis method: random effects model)

3.5 Does participation in structured arts activities improve transferable skills?

A group of studies (eight in total) investigated the impact of arts participation on what might collectively be called transferable skills, including self-constructs, communication skills, social skills and creativity. A number of the studies measured more than one of these outcomes. It is

not clear, however, whether these outcomes are separate phenomena or different manifestations of the same underlying phenomenon. The results for each are reported separately in the sub-sections below. We feel, however, that the results should best be interpreted as a whole. Taken together, we argue that the results suggest that participation in structured arts activities does lead to improved transferable skills compared to non-participation in such activities.

3.5.1 Does participation in structured arts activities improve self-constructs?

Four studies (three carried out in the USA and one in Canada) investigated the impact of participating in arts activities on students' self-constructs: i.e., views about oneself that predict motivation and performance to varying degrees. One study was rated Medium/High overall weight of evidence (Freeman, 2001) and three were rated Medium (Catterall, 2007; Catterall and Peppler, 2007; von Rossberg-Gempton et al., 1999). Three studies included only primary school children and one study (Catterall, 2007) investigated outcomes for students attending middle schools.

The study by Catterall (2007) examined the impact of a school-based extra-curricular multi-component drama initiative called the 'School Project', which used a range of activities, including attending a professional play, as building blocks for students to write and perform plays (for further details see Box 3.4). The dissertation study by Freeman (2001) investigated the impact of multi-component creative drama activities within a school context. Catterall and Peppler (2007) investigated the effects of a multi-component visual arts initiative on inner city children in two major US cities. At one site, the activities were drawing, painting and sculpting, and at the other site the programme involved creating visual art and writing poetry. The final study in this group (undertaken as the main author's dissertation) evaluated the effectiveness of a creative dance programme (von Rossberg-Gempton et al., 1999).

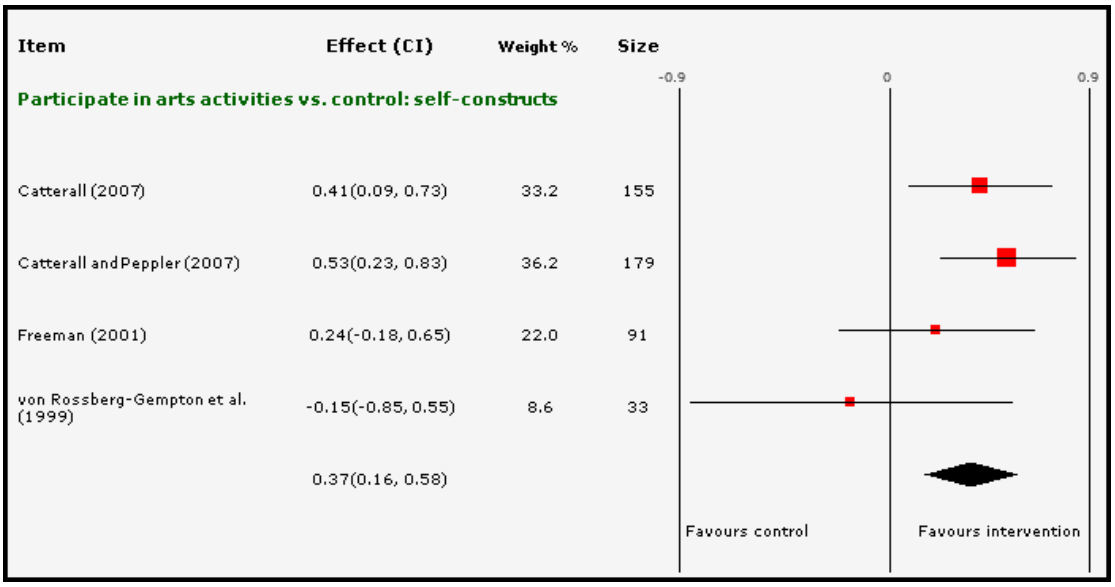
Box 3.4: Evaluation of the 'School Project' (Catterall, 2007)

This North American drama programme used theatre, movement, writing, voice, drawing, and visual arts exercises as building blocks for students to write and perform original plays. Students participated in 90-minute extra-curricular workshops once a week, for 24 weeks. During the course of the programme, all students were taken to see a professional play. The programme took place at three middle-school sites in Los Angeles. Schools were in areas impacted by crime, drug-trafficking and economic hardship. More than 80 percent of participants were from low-income families, and two of the three school sites were among the lowest academic performing schools in the city school system.

The programme aimed to develop students' sense of self, strength in standing up for one's own views and ideas, respect for the views of others, and more positive social interactions. A range of transferable skills were measured, including self-efficacy.

The statistical analysis of heterogeneity suggests that the studies are sufficiently similar to combine. The pooled estimate of effect (g=0.37) indicates that students who participated in arts activities had, on average, higher self-construct scores than those who did not (see Figure 3.5). However, the confidence intervals of two studies cross zero, including that of the one Medium/High study (Freeman, 2001). One of the four studies also reported a negative effect (von Rossberg-Gempton et al., 1999). It is not immediately clear why the results in this study should be negative. One possibility relates to the enrolment of participants in the control group in a specific exercise programme, whereas in the other studies the control groups received 'treatment as usual' (so, in effect, the same comparison was not being made in the von Rossberg–Gempton study as in the other studies).

Figure 3.5: The impact of participating in arts on self-constructs



Heterogeneity statistic Q = 3.6 df = 3 p = 0.302 I^2 = 17.7%, Q* = 3.16; Meta analysis method: random effects model

3.5.2 Does participation in structured arts activities improve communication skills?

Three studies (one conducted in the USA and two in Asia) investigated the impact of participating in arts activities on communication skills. One study was rated Medium/High overall weight of evidence (Kim et al., 2008) and two were rated Medium (Bigelow, 1997; Hui and Lau, 2006). In one study, the participants were pre-school aged boys with autism (Kim et al., 2008). Hui and Lau (2006) focused on children of primary school age and Bigelow investigated impact on high school students. Conducted in Korea, the study by Kim et al. (2008) investigated the impact of participating in music activities (improvisational music therapy) on children's non-verbal social communication skills. The dissertation study by Bigelow (1997) examined the impact of a school-based performing arts course (involving instrumental and vocal music, drama and dance) on students' communication skills. Hui and Lau (2006) conducted their study in Hong Kong, evaluating the impact of an extra-curricular multi-component creative drama project on children's communicative-expressive ability (see Box 3.5 for further details).

Box 3.5: Evaluation of multi-component drama education (Hui and Lau, 2006)

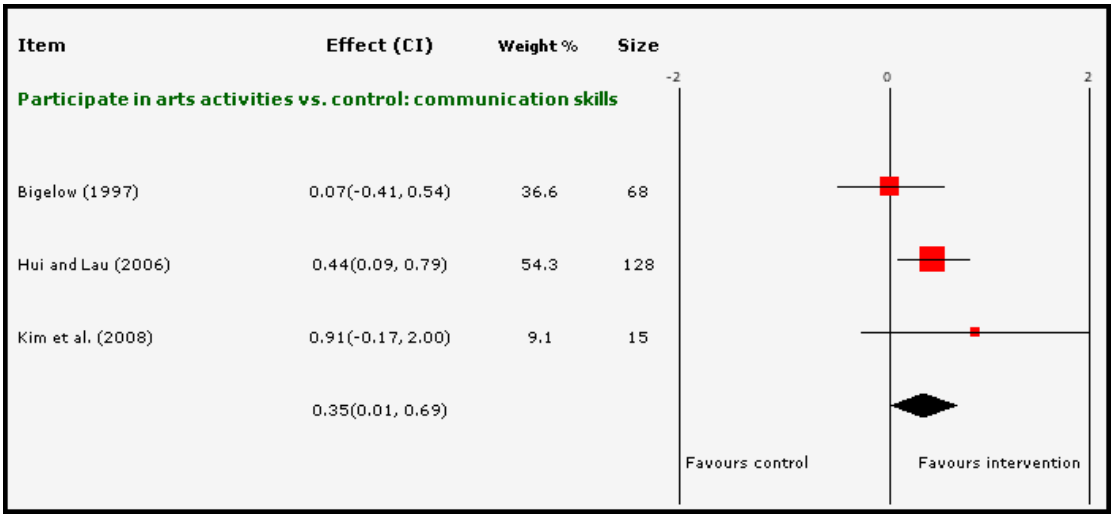
The multi-component drama project evaluated in this study involved puppet making and creative drama (improvisation and story creation). The project was jointly developed by a professional theatre group for children and a non-government organisation for children. The curriculum of the project incorporated knowledge, techniques and attitude in children's development of aesthetics, and creativity, as stated in the Curriculum Guidelines for Primary School Education by the Education Department (Hong Kong). The programme was delivered after school, one day a week for 16 weeks.

An unmatched comparison group design was used. Seventeen elementary schools participated in the drama project. The control group participated in non-aesthetic extra-curricular activities. Changes in students' communicative-expressive ability and creativity (thinking and drawing) were measured.

The statistical assessment of heterogeneity suggests that the studies are similar enough to combine and the pooled estimate of effect (*g*=0.35) indicates that the group that participated in arts activities made greater improvements in communication skills than the group that did not participate in such activities (see Figure 3.6). However, caution is required in interpreting

these results. The study by Kim et al. (2008) found a comparatively large effect size and was conducted with a very small sample with different characteristics from the samples in the other two studies (in this study the participants were all male and had autism). When this study is removed from the meta-analysis (forest plot not shown), the pooled estimate of effect is smaller (g=0.29) and is inconclusive (95% C.I -0.06 to 0.64).

Figure 3.6: The impact of participating in arts on communication skills



Heterogeneity statistic Q = 2.62 df = 2 p = 0.27 I^2 = 23.6%, Q* = 2.07; Meta analysis method: random effects model

3.5.3 Does participation in structured arts activities improve social skills?

Four studies (two conducted in the USA, one in Canada and one in Asia) investigated the impact of participating in arts activities on social skills. Three studies were rated Medium/High quality (Freeman, 2001; Kim et al., 2008; Wright et al., 2006) and one Medium (Catterall, 2007). In one study, the focus was on pre-school aged boys with autism (Kim et al., 2008). Two studies investigated the impact of arts participation on primary school children (Freeman, 2001; Wright et al., 2006). Catterall (2007) focused on children of secondary school age.

Kim et al. (2008) investigated the impact of participating in music activities (improvisational music therapy) on children's pro-social behaviours. Catterall (2007) examined the impact of an extra-curricular multi-component drama initiative called the 'School Project', which used a range of activities, including attending a professional play, as building blocks for students to write and perform plays; pro-social changes in behaviour were measured (for example, problem resolution skills). Freeman (2001) investigated the impact of school-based multi-component creative drama activities on pupils' social skills.

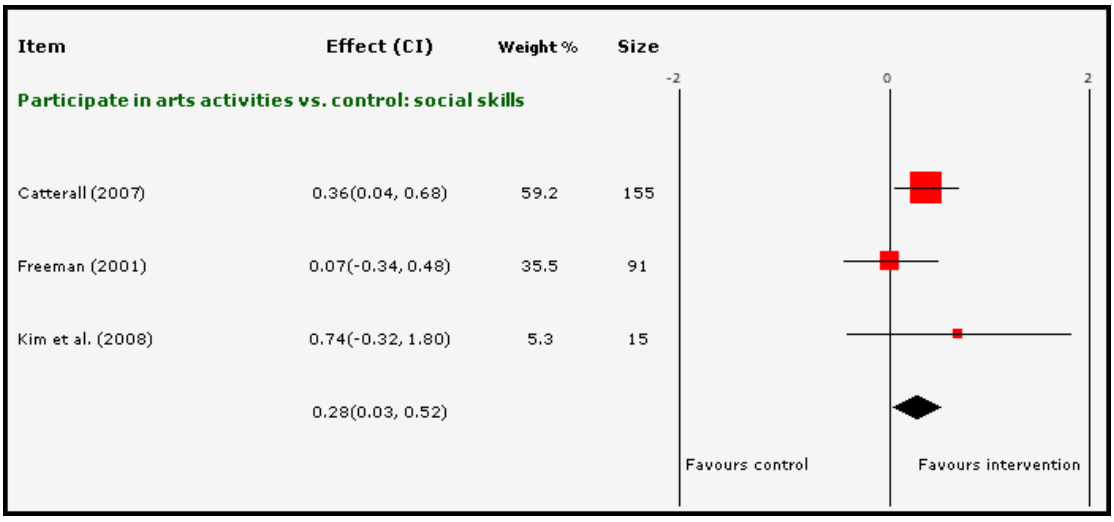
Wright et al. (2006) examined the impact of a structured multi-component arts programme targeted at low-income communities (the National Arts and Youth Demonstration Project) on a range of outcomes for young people, including conduct and pro-social behaviour (see Box 3.6 for further details). The analysis of this study used hierarchical linear modelling and the outcomes were beta-coefficients. With the data reported, it was not possible to calculate standardised mean difference effect sizes. However, the results suggest that the change in scores for participants and non-participants across all the outcomes measured was for all practical purposes the same, i.e., there was no difference in outcome between the groups.

Box 3.6: Evaluation of a structured arts programme (Wright et al., 2006)

This study evaluated a structured arts programme for Canadian youth, aged 9 to 15 years, from low-income communities. The aim of the programme was to engage youth in productive and life-enriching activities rather than correct or treat problems. Young people engaged in structured arts instruction (involving a combination of theatre, visual and media arts) as part of an after-school arts programme delivered twice a week over nine months. Sessions were 90 minutes long. The study used a well-matched comparison group design involving 183 young people. A control group was selected using propensity score matching, with data drawn from the National Longitudinal Survey of Children and Youth (NLSCY).

Excluding Wright et al. (2006), the analysis of statistical heterogeneity suggests that the studies are similar enough to combine (see Figure 3.7). The pooled estimate of effect (*g*=0.28) indicates that the groups that participated in arts activities made greater improvements in social skills than the group that did not participate in such activities. Nonetheless, caution is required in interpreting these results. The study by Kim et al. (2008) found a larger effect size than the other two studies and was conducted with a very small sample with different characteristics from the samples in the other two studies (in this study the participants were all male and had autism). When this study is removed from the meta-analysis (forest plot not shown), the pooled estimate of effect is smaller (g=0.24) and less conclusive (95% C.I -0.03 to 0.52). Furthermore, as noted above, the study by Wright et al. (2006) found no difference in effects between participants and non-participants.

Figure 3.7: The impact of participating in arts on social skills



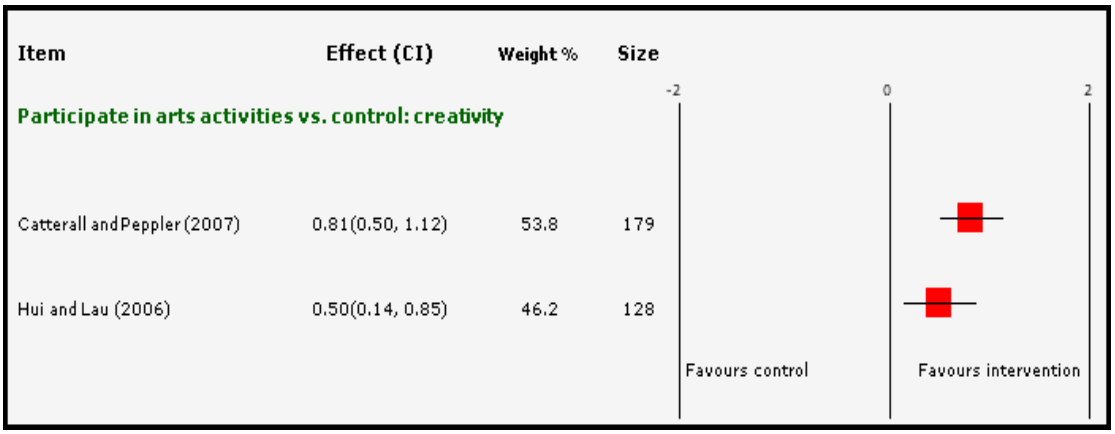
Heterogeneity statistic Q = 1.97 df = 2 p = 0.373 I^2 = 0%, Q* = 1.97; Meta analysis method: random effects model

3.5.4 Does participation in structured arts activities improve creativity?

Two studies (one conducted in Asia (Hong Kong) and one in the USA) investigated the impact of participating in arts on young people's creativity. Both studies were rated Medium quality and were conducted with children of primary school age. Hui and Lau (2006) evaluated an extra-curricular multi-component creative drama project involving puppet making, improvisation and story creation. Catterall and Peppler (2007) investigated the effects of multi-component visual arts instruction on inner city children in two major US cities. At one site, the activities were drawing, painting and sculpting, and at the other site the programme involved creating visual art and writing poetry.

In both studies, the effect size was positive and excluded 'no difference', suggesting that those who took part in the arts activities made greater progress in developing creativity. However, the statistical analysis of heterogeneity suggests that the studies are too dissimilar to combine using meta-analysis (see Figure 3.8).

Figure 3.8: The impact of participating in arts on creativity



Heterogeneity statistic Q = 1.75 df = 1 p = 0.186 I^2 = 42.8%, Q* = 1; Meta analysis method: random effects model

3.6 Other study results

Two studies not yet discussed answered a further two different sub-questions. Synthesis was not possible, as each sub-question was addressed by only one study.

A single study investigated whether participation in arts activities improved students' responses to bullying situations (Merrell, 2005). It was rated Medium overall weight of evidence. This North American doctoral dissertation examined the effectiveness of a drama-based social skills programme (the 5 W's of Bullying Intervention) with a population of 56 urban high school students in the ninth grade. For two outcomes (attitudes to bullying and direct intervention in bullying situations), the direction of effects was positive but inconclusive; for the third outcome (change in reporting bullying) the effect was negative and inconclusive.

A single study investigated the impact of an arts activity on pupils' self-protective skills (Krahe and Knappert, 2009). It was rated Medium overall weight of evidence. The study was described as a group-randomised trial of a theatre-based intervention to prevent sexual abuse. The intervention (No Child's Play) was targeted at first and second grade primary school children in Germany. It also included three-hour training sessions for teachers to prepare them for their task in guiding the children through the performance and a three-hour information evening for parents designed to provide facts and raise awareness about sexual abuse. One hundred and forty-eight students participated in the study. The group who watched a live performance of a play had better performance in the target variables (distinguishing good/bad touch, secrets, getting help, and rejecting unwanted touch) than the control group who did not watch the play (g=0.70).[11]

[11] The first author very generously provided additional data in order that effect sizes could be calculated.

4. Discussion and implications

4.1 Implications for policy and practice

Research evidence does not on its own provide justification for any particular policy decision. Thus, the implications provided here are simply the review teams' interpretations of what we think the balance of evidence indicates is the answer to a particular question using the interpretation framework.

What works:

When compared to non-participation in structured arts activities:

- **Participation in structured arts activities improves academic attainment in secondary school aged students.** Participation in such activities could increase their academic attainment scores by 1% and 2%, on average, above that of non-participants (all other things being equal).
- **Participation in structured arts activities improves pre-school and primary school aged children's early literacy skills.** This result is based on narrative numerical synthesis and thus we are unable to estimate the size of any positive effect.
- **Participation in structured arts activities improves young people's cognitive abilities (based on various measures of intelligence).** Participation of young people in such activities could increase their cognitive abilities test scores by 16% and 19%, on average, above that of non-participants (all other things being equal).
- **Participation in structured arts activities improves young people's transferable skills.** Participation of young people in such activities could increase their transferable skills test scores by 10% and 17%, on average, above that of non-participants (all other things being equal).

What is promising:

There is insufficient yet promising evidence about the impacts of participation in structured arts activities on primary school aged children's academic attainment. The three studies that investigated this question were insufficiently similar to combine using meta-analysis. However, the preponderance of evidence was positive.

What is unknown:

- **There is insufficient evidence about the impacts of participation in structured arts activities on young people's responses to bullying situations.** However, this does not mean that these impacts do not occur.
- **There is insufficient evidence about the impacts of structured arts participation and/or attendance on young people's self-protection skills.** However, this does not mean that these impacts do not occur.

There are two specific issues about the research evidence included in this review that should be taken into account. Firstly, the issue of 'compared to what' and, secondly, the issue of the 'independence' of the subjects in the studies. In most studies, the comparison group either received 'no treatment' or an alternative non-arts activity; however, this does not necessarily mean that they were not engaging with the arts at all. (In some studies, the comparison group would appear to have received ‘treatment as usual’, e.g., their standard arts lesson at school.) For the studies where the outcomes measured were academic attainment, the statistical analysis of the data carried out in the synthesis assumes that all the participants are completely independent of one another. However, the intervention and control participants were allocated at the school level, i.e., all intervention participants were in participating schools and all control group participants were in non-participating schools. This means that the results obtained by individual participants at any particular school are not completely 'independent'. This 'clustering' usually has the effect of making results less conclusive.

There are, of course, many other issues that need to be considered when making judgements about what policy actions, if any, these interpretations suggest. Wider considerations include knowledge of policy and practice in the field, knowledge about economic costs, knowledge about values and beliefs, knowledge about other desirable and undesirable consequences of (in)action, and knowledge about other potential means for achieving the same ends. Any such discussion would also need to consider the generalisability of interventions and study results from the context in which they were generated into the context in which they are used. Discussion of this type is not the role of this review and, as such, the findings presented here form the beginning rather than the end of any investigation and analysis in this area.

4.2 Implications for research

One of the aims of this review was to highlight potential research directions suggested by the current evidence base in this area.

Secondary research

The systematic map (conducted in stage two) identified research evidence that had quantitative measures of the impact of engagement in cultural/sporting activities. In all, 92 high quality studies were included in the map. This in-depth review has only examined a small part of that evidence base (studies that focused on the impact of participating in arts activities on young people's learning outcomes). Future research may wish to explore additional areas of the systematic map. In-depth reviews could be conducted, for example, on the impact of arts participation on different population groups (e.g., older people or women only) or for different outcomes (e.g., social outcomes). This in-depth review only synthesised high quality studies. Further in-depth reviews could also incorporate lower quality studies into the synthesis to further explore the findings reported here.

Further relevant and interesting review work could endeavour to compare the impacts of the interventions included in this review with other potentially relevant policy alternatives. For example, a meta-analysis that assessed the effects of personal development for teachers on student academic outcomes found an overall effect size of d= 0.66 (Timperley et al., 2007). Whilst effect sizes obtained in different meta-analyses (e.g. arts participation and CPD for teachers) are not directly comparable, analysis of such indirect comparisons could provide further useful information for policy decision-making.

Primary research

The in-depth review identified 24 high quality studies that examined the impact of young people's participation in arts activities on their learning outcomes. This is a relatively small yield, suggesting that further primary research is required.

In order to develop the knowledge base, studies need to use designs that adequately control for bias and have sufficiently large populations to facilitate 'transfer' into policy and practice. There also appears to be little, if any, cost-effectiveness analysis in this area, therefore such analysis should be a feature of any new evaluation research that is commissioned.

4.3 Strengths and limitations of this systematic review

This systematic review, undertaken as part of the 'understanding the drivers, impact and value of engagement in culture and sport' project, is, as far as we are aware, the first to have attempted to be comprehensive, systematic and transparent across such a wide body of literature in the field of culture and sport.[12] As such, both the database and the individual in-depth reviews provide an important resource for the culture and sport communities, not only in their content but also in the development of systematic review methods for future investigation of the questions that remain unanswered in the field. However, the review represents only the first step in an ongoing process of building knowledge and understanding about the impact of engagement in the arts. The in-depth review addressed only a very small part of the agenda of interest but, importantly, the systematic and comprehensive approach used means that it will be possible to utilise the database of studies to begin to address some of the other questions of interest in subsequent reviews.

[12] There are systematic reviews on particular aspects of the field, such as factors influencing sports participation and impacts of the arts.

However, there are limitations to the review processes that should be taken into account when considering the results that are presented here. There is a detailed presentation and discussion of the limitations of these processes in the review technical report (Tripney et al., 2010) and only a summary is provided here. The general approach taken by the project was to provide evidence that could be used within a decision-making framework that assessed the relative impacts and values of investments in different kinds of cultural and sporting activities. A different approach may have led to different results. The scope of the review (in terms of what is defined as 'arts') was limited to those arts listed in the 'Taking Part' survey.[13] The process of initial searching, whilst comprehensive, was limited to studies published in the English language, and some studies identified in the searches could not be obtained (mainly US dissertations). The use of text mining technology facilitated the initial broad scope of the review but may have led to relevant studies not being identified in the selection process.

Some limited quality assurance of the search and selection processes was undertaken to assess the extent to which studies may have been missed, either in the initial search or by the text mining. We looked at the reference lists of a recent review of arts participation to identify studies that, based on their title, would appear to have been relevant to this review and thus should have been in our database. The results of this exercise are shown in Table 4.1.

Table 4.1: Results of the quality assurance exercise

	Relevant	**Missed studies**			**Consequences**
	Relevant studies (total) [1]	Missed studies (total)	Missed by search strategy	Missed by text-mining	Missed studies relevant to the in-depth review [2]
Hallam (2009)	59	44	34	10	3

1. Items in this column were identified by screening studies (based on title) in the reference list of the review against the database inclusion criteria
2. Items in this column were identified by screening the missing studies against the in-depth review inclusion criteria. (This could only be completed for those studies for which we were able to obtain full texts; for nine studies, reports were unobtainable.)

The results suggest that our initial search did not identify a number of relevant studies in each sector. A large proportion of the missed studies were North American dissertations, or other grey literature, which are not routinely included in electronic databases and which may have been obtained by the review authors through personal contacts. Some missed studies, however, were published in peer reviewed academic journals and it is not yet clear why these were not detected by our search strategy. Ten studies were not identified by the text mining, all of which were about some aspect of music participation. A likely explanation for this is that the studies, in their titles and/or abstracts, did not use a general descriptive term like 'music' but used a specific term like 'choir'. If the sample of included studies used to create the text mining search string did not include a study that used the specific term in its title or abstract, then this term would not be in the text mining algorithm and thus any studies using only this term would not be identified as relevant to the review.

All relevant items identified during the quality assurance exercise were manually entered into the database. The three available studies that were identified as answering the in-depth review question were included in the synthesis of arts impact studies detailed in this report.

The selection of studies for the in-depth review was limited to only high quality (based on the Maryland Scientific Methods Scale) quantitative studies. It could be argued that this is too restrictive a definition of 'impact'. Whilst defensible, it is acknowledged that this approach may have led to the exclusion of some studies that were 'as good as' those studies that were included. The boundaries between levels two and three of the Maryland Scientific Methods Scale are not necessarily as clear cut as the scale itself might suggest.

[13] http://www.culture.gov.uk/what_we_do/research_and_statistics/4828.aspx

5. References

5.1 References for studies in the in-depth review

*Four studies included in the in-depth review were excluded from the synthesis following the process of data extraction and quality appraisal as their overall weight of evidence was judged to be low or low/medium.

Linked reports (i.e., additional publications relating to the following studies) are detailed in section 5.2.

Bigelow IL (1997) Assessing the relationship between participation in the performing arts in schools and communication apprehension. *Dissertation Abstracts International Section A: Humanities and Social Sciences* M1–58: 0714.

Bilhartz TD, Bruhn RA, Olson JE (1999) The effect of early music training on child cognitive development. *Journal of Applied Developmental Psychology* 20(4): 615-636.

*Bolduc J (2009) Effects of a music programme on kindergartners' phonological awareness skills. *International Journal of Music Education* 27: 37-47.

Catterall JS (2007) Enhancing peer conflict resolution skills through drama: an experimental study. *Research in Drama Education* 12(2): 163-178.

Catterall JS, Peppler KA (2007) Learning in the visual arts and the worldviews of young children. *Cambridge Journal of Education* 37(4): 543–560.

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Appendices

Appendix 1: The standard EPPI-Centre systematic review process

What is a systematic review?

A systematic review is a piece of research following standard methods and stages. A review seeks to bring together and 'pool' the findings of primary research to answer a particular review question, taking steps to reduce hidden bias and 'error' at all stages of the review. The review process is designed to ensure that the product is accountable, replicable, updateable and sustainable. The systematic review approach can be used to answer any kind of review question. Clarity is needed about the question, why it is being asked and by whom, and how it will be answered. The review is carried out by a review team/group.

Stages and procedures in a standard EPPI-Centre review

- Formulate review question and develop protocol.
- Define studies to be included with inclusion criteria.
- Search for studies (a systematic search strategy including multiple sources is used).
- Screen identified potentially relevant studies against the inclusion criteria (inclusion criteria should be specified in the review protocol).
- The results of screening (number of studies excluded under each criterion) should be reported.
- Collect data in order to describe the characteristics of studies (keywording and/or in-depth data extraction).
- Maintain bibliographic and review management data on individual studies.
- Present descriptive information on each study in form of a 'map'.

At this stage the review question may be further focused and additional inclusion criteria applied to select studies for an 'in-depth' review

- In-depth data extraction, including the results or findings of each study.
- Assess study quality and relevance (the criteria used to make such judgements should be transparent and systematically applied).
- Synthesise findings (the results of individual studies are brought together to answer the review question/s).
- A variety of approaches can be used to synthesise the results. The approach used should be appropriate to the review question and studies in the review.
- The review team interpret the findings and draw conclusions and implications from them.

Quality assurance

Quality assurance (QA) can check the execution of the methods of the review, just as in primary research; for example, through:

- Internal QA: individual reviewer competence; moderation; double coding.
- External QA: audit/editorial process; moderation; double coding.
- Peer referee of: protocol; draft report; published report feedback.
- Editorial function for report: by review specialist; peer review; non-peer review.

Appendix 2: Inclusion and exclusion criteria

Stage 1: database creation

No.	Exclusion criteria	Inclusion criteria
1.	Study not published in English.	Study published in English.
2.	Study published prior to 1997.	Study published during or after 1997.
3.	Study is off-topic – i.e., is not about people's engagement in culture and/or sport.	Study is about engagement in culture and/or sport.
4.	Is solely methodological research.	Study involves a methodological aspect (e.g., the aim is to validate an instrument), but findings about people's engagement in culture and/or sport are also reported.
5.	Is not empirical primary research (e.g., opinion pieces, book reviews, bibliographies, newspaper articles, editorials, strategy documents).	Is empirical primary research.
6.	Study is about engagement in cultural and/or sporting activities/sites, but the cultural activity/site is not as defined in the *Taking Part* list (exclude, for example, studies about walking, wrestling, reading stories or poetry, or architecture).	Study is about engagement in cultural and/or sporting activities/sites, as defined in the *Taking Part* list.
7.	Study investigates a sports- or exercise-based rehabilitation/ treatment programme for people with pre-existing, non-chronic, physical health problems (for example, post-surgical interventions).	Study investigates a sports or exercise-based rehabilitation/ treatment programme for people with pre-existing mental health problem or with chronic health problems, such as arthritis or back pain.
8.	Study only measures bio-medical outcomes of engagement in sport (this criterion only applies to studies about engagement in sport).	Study measures other outcomes - in addition to bio-medical outcomes - for engagement in sport (this criterion only applies to studies about engagement in sport).

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Stage 2: mapping exercise (high quality quantitative studies)

No.	Exclusion criteria
1.	Out of scope (as defined by the selection criteria outlined above)
2.	Not an impact study
3.	Non-systematic review
4.	No control group

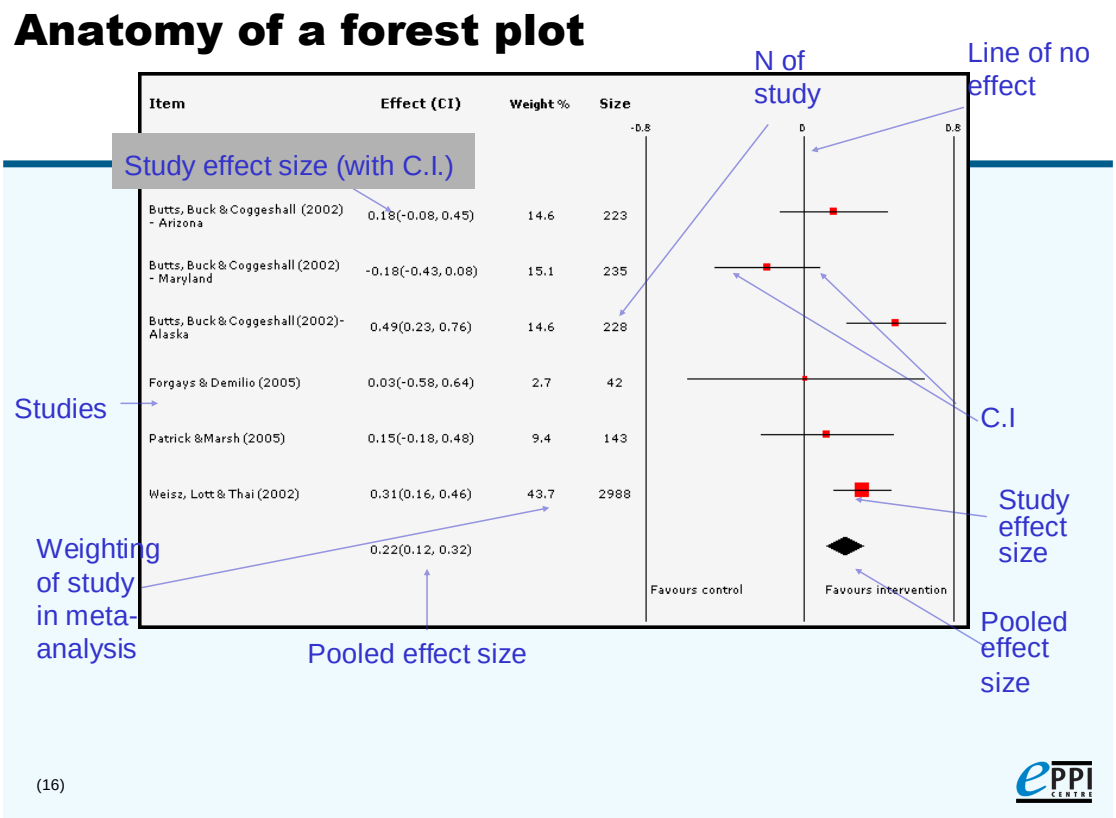
5.	Not participation (in sporting activities) or attending or participation (in cultural activities); i.e., exclude studies about the remaining two engagement modes - deciding and producing - or studies about attending sporting events (either virtual or actual)
6.	Not quantitative
7.	Not pre-post
8.	Other outcomes (e.g., health-related)

Stage 3: in-depth review (high quality studies)

No.	**Exclusion criteria**
1.	Study did not focus on children/young people
2.	Study did not measure at least one learning outcome
3.	Learning outcome measured was related to the cultural/sporting activity (e.g., sports performance, musical skills, etc.)
4.	Learning outcome measured was health-related knowledge/awareness (e.g., knowledge about STDs, HIV, etc.)
5.	Not participation in arts activities*

* These studies were included in the in-depth review of research on learning outcomes for young people participating in sport (Bird et al., 2010).

Appendix 3: Forest plots



Appendix 4: Study quality assessment framework

The following table outlines the procedure for calculating an overall quality rating (WoE D): for a fuller explanation, see the review technical report (Tripney et al., 2010).

WoE A: Quality of the execution of the study	**WoE B: Study design**	**WoE C: Study relevance**	**WoE D: Overall quality rating**
Was the knowledge of allocation to groups adequately prevented? **Was incomplete outcome data addressed?** **Were the groups treated equally?** **Are the outcome measures reliable?** Answers to individual questions were scored as follows and a total score calculated: • yes = 1 • no = 2 • not relevant = 2 • unclear = 2	What i**s the design of the study?** Answers were scored as follows: • Randomised controlled trial (MSMS level 5) = score of 5 • Well-matched comparison group[1] pre-post test design (MSMS level 4) = score of 4 • Unmatched comparison group pre-post test design (MSMS level 3) = score of 3 • Single group pre-post test design OR comparison group post-test only design (MSMS level 2) = score of 2 • Single group post-test only design (MSMS level 1) = score of 1 If studies scored 5 or 4, then two additional questions were applied. **Was the allocation sequence adequately generated?** **Was the allocation adequately concealed?** If the answer was 'no' to either of these questions, 1 was subtracted from the score for that study.		
High = score of 4 Medium/High = score of 5 Medium = score of 6 Low/Medium = score of 7 Low = score of 8	High = score of 5 Medium/High = score of 4 Medium = score of 3 Low/Medium = score of 2 Low = score of 1	Fixed at 'High'	Not higher than WoE A or WoE B[2]

1. Post-hoc statistical analysis used to control for differences between groups and comparison group considered to be well-matched to the intervention group on theoretically relevant factors (e.g., age, gender, etc.).
2. A pre-established formula was used for moving from A, B and C to D. In this review, only A and B were taken into consideration and D could not be not greater than A or B (e.g., if A was medium/high and B was medium, then D would be medium).

Appendix 5: Synthesis interpretation framework

What works	These culture and/or sport programmes demonstrate evidence of beneficial impacts on participants compared to an alternative At least two evaluations of medium or greater quality with a positive pooled estimate of effect that excludes a result of no difference
What does not work	These culture and/or sport programmes demonstrate evidence of negative impacts on participants compared to an alternative. At least two evaluations of medium or greater quality with a negative pooled estimate of effect that excludes a result of no difference
What is promising	These are programmes where the level of certainty from available evidence is too low to support generalisable conclusions, but where there is some empirical basis for predicting that further research could support such conclusions Programmes are coded as promising if the pooled estimate of effect was found to be positive but did not exclude zero and there was at least one medium or better quality evaluation and the preponderance of the remaining evidence was also positive
What is unknown	Any programme not classified in one of the three above categories is defined as having unknown effects

Appendix 6: Study quality, outcome, and effect sizes

Author Quality	Outcome[1]	Group 1 N | M | SD	Group 2 N | M | SD	Hedges' g (corrected)[2]	CI lower | upper
Bigelow (1997) Medium	Transferable skills (communication apprehension): students (boys and girls) who participate in performing arts in schools vs students (boys and girls) that do not	35 | -2.900 | 14.962	33 | -4.000 | 16.711	0.069	-0.407 | 0.544
	Transferable skills (communication apprehension): boys who participate in performing arts in schools vs boys that do not	12 | -2.800 | 13.965	18 | -7.900 | 16.730	0.316	-0.419 | 1.051
	Transferable skills (communication apprehension): girls who participate in performing arts in schools vs girls that do not	23 | -3.000 | 15.861	15 | 0.600 | 17.067	-0.216	-0.868 | 0.437
Bilhartz et al. (1999) **Medium**	Cognitive performance (Stanford Binet tests overall results): music treatment vs treatment as usual	36 | 0.000 | 0.000	35 | 0.000 | 0.000	0.514	0.041 | 0.988
Catterall (2007) **Medium**	Transferable skills (problem resolution skills): drama vs no treatment	71 | 0.000 | 0.000	84 | 0.000 | 0.000	0.358	0.040 | 0.677
	Transferable skills (meta-cognitive skills): drama vs no treatment	71 | 0.000 | 0.000	84 | 0.000 | 0.000	0.358	0.040 | 0.677
	Transferable skills (self-efficacy): drama vs no treatment	71 | 0.000 | 0.000	84 | 0.000 | 0.000	0.408	0.089 | 0.727
Catterall and Peppler (2007) Medium	Creativity (originality scale): visual arts classes vs no visual arts classes	103 | 0.370 | 0.491	76 | -0.040 | 0.517	0.813	0.505 | 1.121
	Transferable skills (self efficacy scale): all visual sites arts vs all sites comparison	103 | 0.320 | 0.835	76 | -0.111 | 0.770	0.531	0.229 | 0.832

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
Costa-Giomi (2004) Medium/High	Academic achievement/skills (language): piano vs treatment as usual	67 | 0.000 | 0.000	50 | 0.000 | 0.000	0.486	0.115 | 0.858
	Academic achievement/skills (mathematics): piano vs treatment as usual	67 | 0.000 | 0.000	50 | 0.000 | 0.000	0.317	-0.051 | 0.686
	Cognitive performance (general cognitive abilities): piano instruction vs no piano	67 | 0.000 | 0.000	50 | 0.000 | 0.000	0.483	0.111 | 0.854
Fleming et al. (2004) Medium	Academic achievement/skills (reading) drama vs treatment as usual	58 | 0.000 | 0.000	50 | 0.000 | 0.000	0.400	0.018 | 0.782
	Academic achievement/skills (mathematics) drama vs treatment as usual	58 | 0.000 | 0.000	50 | 0.000 | 0.000	0.830	0.435 | 1.225
Freeman (2001) Medium/High	Transferable skills (self-concept scores): creative drama activities vs treatment as usual (no creative drama activities)	48 | 0.000 | 0.000	43 | 0.000 | 0.000	0.238	-0.175 | 0.651
	Truancy rates/behaviour problems (frequency of problem behaviour): creative drama activities vs no creative drama activities	48 | 0.000 | 0.000	43 | 0.000 | 0.000	0.099	-0.313 | 0.511
	Transferable skills (social skills score): creative drama activities vs treatment as usual (no creative drama activities)	48 | 0.000 | 0.000	43 | 0.000 | 0.000	0.069	-0.342 | 0.481
Gromko (2005) **Medium**	Academic achievement/skills (phonemic awareness skills: letter-naming fluency): music instruction vs no music instruction	43 | 9.210 | 10.380	60 | 7.830 | 12.610	0.117	-0.275 | 0.509
	Academic achievement/skills (phonemic awareness skills: phoneme-segmentation fluency): music instruction vs no music instruction	43 | 26.120 | 16.050	60 | 15.720 | 13.830	0.698	0.294 | 1.101

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
	Academic achievement/skills (phonemic awareness skills: nonsense-word fluency): music instruction vs no music instruction	43 | 9.860 | 9.790	60 | 15.420 | 19.600	-0.339	-0.734 | 0.055
Gromko and Poorman (1998) Medium	Cognitive performance (IQ) Music training vs no music training	15 | 17.600 | 17.000	15 | 9.240 | 15.884	0.494	-0.232 | 1.221
	Cognitive performance (Scaled IQ) Music training vs no music training	15 | 11.600 | 11.090	15 | 6.730 | 10.400	0.441	-0.284 | 1.165
Hui and Lau (2006) Medium	Creativity: participate in drama project vs non-aesthetic extra-curricular activities	61 | 0.000 | 0.000	67 | 0.000 | 0.000	0.308	-0.041 | 0.657
	Creativity: participate in drama project vs non-aesthetic extra-curricular activities	61 | 0.000 | 0.000	67 | 0.000 | 0.000	0.497	0.145 | 0.849
	Transferable skills (communicative-expressive ability): participate in drama project vs non-aesthetic extra-curricular activities	61 | 0.000 | 0.000	67 | 0.000 | 0.000	0.437	0.086 | 0.788
Kendall et al. (2008) Medium/High	Academic achievement/ skills (GCSE total points score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2003/2004)	1,587 | 0.000 | 0.000	1,267,719 | 0.000 | 0.000	0.037	-0.012 | 0.086
	Academic achievement/ skills (GCSE 'best 8' score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2003/2004)	1,587 | 0.000 | 0.000	1,267,719 | 0.000 | 0.000	0.016	-0.033 | 0.065

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
	Academic achievement/ skills (GCSE English): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2003/2004)	1,587 | 0.000 | 0.000	1,267,719 | 0.000 | 0.000	-0.011	-0.060 | 0.038
	Academic achievement/ skills (GCSE mathematics): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2003/2004)	1,587 | 0.000 | 0.000	1,267,719 | 0.000 | 0.000	-0.009	-0.058 | 0.040
	Academic achievement/ skills (GCSE science): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2003/2004)	1,587 | 0.000 | 0.000	1,267,719 | 0.000 | 0.000	0.051	0.002 | 0.100
	Academic achievement/ skills (average KS2 score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	8,670 | 0.000 | 0.000	1,005,105 | 0.000 | 0.000	-0.001	-0.022 | 0.020
	Academic achievement/ skills (KS2 English score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	8,670 | 0.000 | 0.000	1,005,105 | 0.000 | 0.000	0.016	-0.005 | 0.037
	Academic achievement/ skills (KS2 mathematics score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	8,670 | 0.000 | 0.000	1,005,105 | 0.000 | 0.000	-0.001	-0.022 | 0.020

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
	Academic achievement/ skills (KS2 science score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	8,670 | 0.000 | 0.000	1,005,105 | 0.000 | 0.000	-0.019	-0.040 | 0.002
	Academic achievement/ skills (average KS3 score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	6,493 | 0.000 | 0.000	1,104,907 | 0.000 | 0.000	0.062	0.038 | 0.086
	Academic achievement/ skills (KS3 English score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	6,493 | 0.000 | 0.000	1,104,907 | 0.000 | 0.000	0.081	0.057 | 0.105
	Academic achievement/ skills (KS3 mathematics score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	6,493 | 0.000 | 0.000	1,104,907 | 0.000 | 0.000	0.048	0.024 | 0.072
	Academic achievement/ skills (KS3 science score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally	6,493 | 0.000 | 0.000	1,104,907 | 0.000 | 0.000	0.054	0.030 | 0.078
	Academic achievement/ skills (GCSE total point score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2005/2006)	5,188 | 0.000 | 0.000	1,081,248 | 0.000 | 0.000	0.101	0.074 | 0.128

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
	Academic achievement/ skills (GCSE 'best 8' point score): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2005/2006)	5,188 | 0.000 | 0.000	1,081,248 | 0.000 | 0.000	0.077	0.050 | 0.104
	Academic achievement/ skills (GCSE mathematics): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2005/2006)	5,188 | 0.000 | 0.000	1,081,248 | 0.000 | 0.000	0.028	0.001 | 0.055
	Academic achievement/ skills (GCSE English): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2005/2006)	5,188 | 0.000 | 0.000	1,081,248 | 0.000 | 0.000	0.069	0.042 | 0.096
	Academic achievement/ skills (GCSE science): overall difference between young people known to have attended 'Creative Partnerships' and similar young people nationally (KS4: 2005/2006)	5,188 | 0.000 | 0.000	1,081,248 | 0.000 | 0.000	0.064	0.037 | 0.091
Kim et al. (2008) Medium/High	Transferable skills (joint attention skills and pro-social behaviours): music therapy vs play sessions (time 3 minus time 1)	8 | 0.000 | 0.000	7 | 0.000 | 0.000	0.744	-0.317 | 1.804
	Transferable skills (joint attention skills and pro-social behaviours): music therapy vs play sessions (time 2 minus time 1)	8 | 0.000 | 0.000	7 | 0.000 | 0.000	0.913	-0.170 | 1.996
Krahe and Knappert (2009) Medium	Transferable skills (self-protective skills): attend live drama vs no treatment (time 2 minus time 1)	44 | 6.710 | 6.480	49 | 1.580 | 7.030	0.751	0.329 | 1.173
	Transferable skills (self-protective skills): attend live drama vs no treatment (time 3 minus time 1)	44 | 6.000 | 7.290	49 | 0.020 | 9.250	0.708	0.287 | 1.128

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
McMahon et al. (2003) Medium	Academic achievement/ skills (consonant sound recognition) Basic Reading through Dance (BRD) vs no BRD	290 | 0.000 | 0.000	338 | 0.000 | 0.000	0.589	0.429 | 0.750
	Academic achievement/ skills (overall phoneme) Basic Reading through Dance (BRD) vs no BRD	242 | 0.000 | 0.000	274 | 0.000 | 0.000	0.619	0.442 | 0.796
	Academic achievement/ skills (vowel recognition) Basic Reading through Dance (BRD) vs no BRD	266 | 0.000 | 0.000	338 | 0.000 | 0.000	0.360	0.198 | 0.521
Merrell (2005) Medium	Transferable skills (actual reporting of bullying): drama-based social skills programme vs treatment as usual (Freshman Seminars)	30 | 0.240 | 0.570	30 | 0.280 | 1.746	-0.030	-0.536 | 0.476
	Transferable skills (direct intervention in bullying situations): drama-based social skills programme vs treatment as usual (Freshman Seminars)	30 | 0.000 | 0.000	30 | 0.000 | 0.000	0.158	-0.349 | 0.665
	Transferable skills (attitudes to bullying): drama-based social skills programme vs treatment as usual (Freshman Seminars)	30 | 0.000 | 0.000	30 | 0.000 | 0.000	0.355	-0.155 | 0.866
Orsmond and Miller (1999) **Medium**	Cognitive performance (Peabody Picture Vocabulary Test): music training vs no music training	29 | 5.860 | 17.911	29 | 6.380 | 26.348	-0.023	-0.538 | 0.492
	Cognitive performance (Developmental Test of visual-motor Integration): music training vs no music training	29 | 1.780 | 2.984	29 | 0.270 | 2.557	0.536	0.012 | 1.060
	Cognitive performance (Puzzle solving subtest): music training vs no music training	29 | 10.050 | 16.737	29 | 5.710 | 20.909	0.226	-0.290 | 0.742
	Cognitive performance (Preschool Embedded Figures Test): music training vs no music training	29 | -0.230 | 2.325	29 | -0.530 | 2.538	0.122	-0.394 | 0.637

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
Piro and Ortiz (2009) **Medium**	Academic achievement/ skills (early reading skills/vocabulary): keyboard lessons vs no keyboard lessons	46	57	1.28	0.85 | 1.7
	Academic achievement/ skills (early reading skills/verbal sequencing): keyboard lessons vs no keyboard lessons	46	57	1.5	1.1 | 2.0
Rauscher and Zupan (2000) Medium	Cognitive performance, music instruction featuring the keyboard vs treatment as usual (no keyboard); Puzzle solving task	34 | 7.450 | 5.210	28 | 2.940 | 3.170	1.010	0.479 | 1.541
	Cognitive performance: music instruction featuring the keyboard vs treatment as usual (no keyboard access); Pictorial Memory Test baseline to 8 months	34 | 1.500 | 1.172	28 | 0.570 | 1.136	0.794	0.275 | 1.314
	Cognitive performance; music instruction featuring the keyboard vs treatment as usual (no keyboard access); Block Building test pretest-8 months	28 | -18.960 | 45.100	34 | -49.960 | 42.550	0.700	0.185 | 1.215
	Cognitive performance; music instruction featuring the keyboard vs treatment as usual (no keyboard access); Puzzle solving pretest-4 months	34 | 4.650 | 4.341	28 | 1.820 | 2.893	0.743	0.226 | 1.260
	Cognitive performance; music instruction featuring the keyboard vs treatment as usual (no keyboard access); Block Building pretest-4 months	28 | -3.120 | 46.599	34 | -37.940 | 44.513	0.756	0.239 | 1.274
	Cognitive performance; music instruction featuring the keyboard vs treatment as usual (no keyboard access); Pictorial Memory pretest-4 months	34 | 0.940 | 0.995	28 | -0.290 | 1.282	1.072	0.537 | 1.607
Rauscher et al. (1997)	Cognitive performance: Piano vs as usual (OA scores immediate post test)	34 | 3.620 | 2.770	14 | 0.500 | 2.550	1.133	0.470 | 1.795

Author **Quality**	**Outcome**[1]	**Group 1 N | M | SD**	**Group 2 N | M | SD**	**Hedges' g (corrected)**[2]	**CI lower | upper**
Medium	Cognitive performance: structured singing lesson vs activity as usual	10 | 0.300 | 3.560	14 | 0.500 | 2.550	-0.064	-0.876 | 0.747
Register (2004) Medium	Academic achievement/ skills (emergent literacy): changes in scores for letter naming: music vs control	22 | 8.050 | 17.526	20 | 4.050 | 15.090	0.239	-0.369 | 0.847
	Academic achievement/ skills (emergent literacy): changes in scores for initial sounds fluency: music vs control	22 | 8.270 | 7.712	20 | 6.250 | 5.981	0.285	-0.323 | 0.894
	Academic achievement/ skills (emergent literacy): changes in scores for Test of Early Reading Ability 3rd Edition: music vs control	22 | 4.130 | 7.355	20 | 5.600 | 9.118	-0.175	-0.782 | 0.432
Schellenberg (2004) Medium/High	Cognitive performance (IQ): keyboard lessons vs no lessons	36 | 6.100 | 11.121	36 | 3.900 | 9.801	0.208	-0.256 | 0.671
	Cognitive performance (IQ): voice lessons vs no lessons	36 | 7.600 | 11.842	36 | 3.900 | 9.802	0.337	-0.129 | 0.802
	Cognitive performance (IQ): drama lessons vs no lessons	36 | 5.100 | 13.701	36 | 3.900 | 9.802	0.100	-0.363 | 0.562
Standley and Hughes (1997) Medium	Academic achievement/ skills: developmental writing and language skills score: music lessons with emphasis on pre-reading and writing vs no music lessons	17 | 0.000 | 0.000	15 | 0.000 | 0.000	0.907	0.173 | 1.640
von Rossberg-Gempton et al. (1999) Medium	Cognitive abilities: creative dance vs physical education	20 | 14.421 | 6.021	13 | 10.923 | 5.346	0.592	-0.123 | 1.306
	Transferable skills: positive affect/happiness: dance vs physical education (12 weeks)	20 | -0.308 | 0.855	13 | -0.125 | 0.641	-0.229 (for this instrument a negative effect size = a favourable outcome)	-0.930 | 0.472
	Transferable skills: affective skills (self-concept): dance vs physical education (pre-post)	20 | -0.526 | 4.221	13 | 0.000 | 1.528	0.15	0.000 | 0.000

1. Where a zero is shown in the mean column, it means that the effect size was calculated from another value given by the author in the paper, e.g., a t-value.

2. Where a zero is shown in the column, it means that the effect size is smaller than 0.000

Appendix 7: Arts studies structured abstracts

Item	Study	Sample	Activity/Intervention
Bigelow (1997) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'The purpose of this study is to examine the relationship between (a) participation in the performing arts within school curricula and (b) levels of communication apprehension.' (p.4) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Transferable skills: *1.Communication skills* **Which methods were used to collect the data?** Personal Report of Communication Apprehension-24 (PRCA-24)	**In which country/countries was the study conducted?** USA **Number of participants** Alpha school: 35 Omega school: 33 **Age of participants** 11-15 years **Type of educational institution attended** Secondary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): performing arts course (instrumental and vocal music, drama and dance) (p.11) **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** One semester (p.48) **Intensity of the activity/intervention** 1-2 per week (assumed) **What treatment/intervention did the control/comparison group receive?** No treatment: core elective classes (but not performing arts classes)
Bilhartz et al. (1999) Overall weight of evidence: Medium	**What are the broad aims of the study?** To examine the relationship between participation in a structured music curriculum and cognitive development. **What was the design of the evaluation?** Unmatched comparison group study	**In which country/countries was the study conducted?** USA **Number of participants** 71 participants: 36 (experimental treatment group) 35 (control group) (p.618)	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: Kindermusik for the Young Child Year 1

Item	Study	Sample	Activity/Intervention
	(Maryland Scale 3) **What learning outcomes does the study measure/report?** Cognitive performance **Which methods were used to collect the data?** 1. Parents or guardians were asked to complete a questionnaire about their children. (p.618) 2. Young Child Music Skills Assessment (MSA) *(not relevant to this review)* 3. Stanford-Binet Intelligence Scale, fourth edition (SB)	**Age of participants** 0-5 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	Pilot Programme **Arts participation** Arts (multi-component): 'The weekly lessons for the age group in this study involve vocal exploration and matching pitch, singing, playing percussion instruments and the glockenspiel, exploring and notating basic rhythms, learning to read and write music on a treble staff, composing, and developing coordination and balance through movement.' (p.620) **Duration of the activity/intervention** 30 weeks (p.620) **Intensity of the activity/intervention** 75 minutes once weekly (p.620) **What treatment/intervention did the control/comparison group receive?** Treatment as usual: '..children in the control group attended their respective preschools but received no additional in-class music treatment.' (p.620)
Catterall (2007) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'This article explores learning in drama through contemporary theories of knowledge acquisition' (p.2) 'A primary goal was enhancing prosocial behavior….' (p.9) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study**	**In which country/countries was the study conducted?** USA **Number of participants** 71 (intervention), 84 (control) (p.10) **Age of participants** 11-15 years **Type of educational institution attended**	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: the 'School Project'. **Arts attendance and participation** Arts (multi-component): 'The program used theatre, movement, and

Item	Study	Sample	Activity/Intervention
	measure/report? Transferable skills *1. Conditions and processes of learning (meta-cognitive skills, self-efficacy, general outlook)* *2. Pro-social changes in behaviour (ability to work with others when disagreeing, ability to work effectively in groups, problem resolution skills) (pp.17-18)* **Which methods were used to collect the data?** 'The principal means of generating and gathering data was through surveys administered to all students prior to the program and again after completion of the program…The items in the survey instrument were supplemented with questions based on standard instruments designed to assess student attitudes and motivation.' (p.10)	Secondary school **Sex of participants** Not stated **Are outcomes reported for any of the priority groups?** BME, low SES (high proportion of participants from these groups)	writing, as well as voice, drawing, and visual arts exercises as building blocks for students to write and perform original plays. On one of the appointed days, all students were taken to see a professional play' (p.8) **What is/are the setting(s) of the activity/intervention?** School-based extra-curricular clubs **Duration of the activity/intervention** 24 weeks **Intensity of the activity/intervention** 90 minute workshops once a week **What treatment/intervention did the control/comparison group receive?** Treatment as usual
Catterall and Peppler (2007) Overall weight of evidence: Medium	**What are the broad aims of the study?** The broad aims were to investigate 'the effects of rich, sustained visual arts instruction on inner city 9-year-olds in two major US cities.' (p.543) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Transferable skills: *1. General self-concept*	**In which country/countries was the study conducted?** USA **Number of participants** 179 students took part (103 who attended ICA or COCA classes and 76 comparison class students). (p.552) **Age of participants** 6-10 years **Sex of participants** Mixed sex	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: 1. Inner City Arts (ICA) based in Los Angeles, 2. Centre of Contemporary Arts (COCA) based in St. Louis **Arts participation** Arts (multi-component): At ICA the activities were drawing, painting and sculpting. The programme at COCA

Item	Study	Sample	Activity/Intervention
	2. Self-efficacy *3. Internal attributions for success* *4. Perceived number of future choices* Creativity: *1. Originality* *2. Elaboration* *3. Flexibility* *4. Fluency* **Which methods were used to collect the data?** 'Survey items were drawn to establish multi-item scales	**Any other important features of the participants** There was one treatment (arts) and one control, but two different sites were used in the study (Los Angeles, St. Louis). **Are outcomes reported for any of the priority groups?** BME, low SES (participants almost exclusively from these groups)	involved creating visual art and writing poetry. **What is/are the setting(s) of the activity/intervention?** School (in school hours) Other educational setting **Duration of the activity/intervention** 20 weeks (ICA) 30 weeks (COCA) **Intensity of the activity/intervention** About 90 minutes, twice per week (ICA) once per week for one-hour (COCA) **What treatment/intervention did the control/comparison group receive?** Treatment as usual (assumed they received standard art classes)
Costa-Giomi (2004) Linked report: Costa-Giomi (1999) Overall weight of evidence: Medium/High	**What are the broad aims of the study?** 'to investigate the effects of piano instruction on children's development' **What was the design of the evaluation?** Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** Academic achievement/skills **If academic achievement is measured, what subjects does the study focus on?** Literacy, Numeracy **Which methods were used to collect the data?**	**In which country/countries was the study conducted?** Canada **Number of participants** 117 children (58 girls, 59 boys) (p.142) **Age of participants** 6-10 years **Type of educational institution attended** Primary school **Sex of participants** Mixed sex **Any other important features of the participants**	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Play a musical instrument *(piano/keyboard instruction)* **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** 'Each child in the experimental group

Item	Study	Sample	Activity/Intervention
	1. Language and mathematics subtests: Level 14 of the Canadian Achievement Test 2 (CAT2) 2. Coopersmith Self-Esteem Inventories (long form) *(not relevant to this review)* 3. Level E of the Developing Cognitive Abilities Test (DCAT) 4. Report cards for English, French, music and mathematics 5. Fine motor subtests of the Bruininks-Oseretsky Test of Motor Proficiency *(not relevant to this review)*	'The 117 children (58 girls and 59 boys) selected to participate in the study had never participated in formal music instruction, did not have a piano at home, and their family income was below $40,000 Canadian ($30,000 US at the time of the investigation) per annum. Approximately 25 percent of the children had unemployed parents and 30 percent lived with a single parent.' (p.142) **Are outcomes reported for any of the priority groups?** Low SES (intervention targeted at this group)	received.....three years of piano instruction and an acoustic piano.' p143 **Intensity of the activity/intervention** 1-2 per week: 'The lessons were 30 minutes long during the first two years and 45 minutes during the third year.' p143 **What treatment/intervention did the control/comparison group receive?** Treatment as usual
Fleming et al. (2004) Linked report: Merrell and Tymms (2002) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'This article reports on research which examined the impact of The National Theatre's Transformation drama project on young pupils' reading, mathematics, attitude, self-concept and creative writing in primary schools.' (p.177) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills Attitude to learning *Attitude to mathematics, reading and school (not used in outcome measures as data not reported to calculate effect sizes)*	**In which country/countries was the study conducted?** UK **Number of participants** 165 students **Age of participants** 6-10 years **Sex of participants** Mixed sex **Any other important features of the participants** The primary schools were in the Shadwell and Limehouse areas of the East End of London (Borough of Tower Hamlets). A large number of the pupils were learning English as an additional language. (p.181). There were 2 intervention schools and 2 control schools. **Are outcomes reported for any of the**	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: The National Theatre's Transformation drama project. **Arts attendance and participation** Arts (multi-component): 1. Write plays, perform plays 2. Part of the project involved three visits to the theatre to watch professional performances. (p.182) **What is/are the setting(s) of the activity/intervention?** School (in school hours) Arts setting (e.g. theatre/gallery) **Duration of the activity/intervention** Just under 2 years. 'All Year 3 pupils were

Item	Study	Sample	Activity/Intervention
		priority groups? Unclear/BME (many children were learning English as an additional language)	assessed in September 1999 ... They were then re-assessed at the end of Year 4 after two years of Transformation interventions.' (p.183) **Intensity of the activity/intervention** "The broad pattern for working with the children was similar each year. It took place over two terms with serial workshops in the first term and a two-week block in the second. During the second stage, five drama workshops were conducted leading up to a celebratory sharing of the work in a venue outside schools. Part of the project involved three visits to the theatre to watch professional performances." (pp.181-2) **What treatment/intervention did the control/comparison group receive?** Treatment as usual: standard drama lessons (assumed)
Freeman (2001) Overall weight of evidence: Medium/High	**What are the broad aims of the study?** 'The purpose of this study was to determine the effects of creative drama activities on the self-concept, behaviour, and social skills of third and fourth year students.' (p.2) **What was the design of the evaluation?** Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** Transferable skills *1. Social skills*	**In which country/countries was the study conducted?** USA **Number of participants** 237 subjects participated: 119 from grade 3, 118 from grade 4; 120 in the intervention group, 117 controls **Age of participants** 6-10 years **Type of educational institution attended** Primary school	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): Creative drama activities **What is/are the setting(s) of the activity/intervention?**

Item	Study	Sample	Activity/Intervention
	2. Self-concept Truancy rates/behaviour problems *Behaviour* **Which methods were used to collect the data?** 1. The Student Self-Concept Scale (SSCS) was used to measure student self-concept. 2. The Social Skills Rating System (SSRS) was used to measure social skills and problem behaviour. 3. Behaviour was also measured using computer records of office referrals from the study year and the prior year.	**Sex of participants** Mixed sex Mixed ethnicity and SES **Are outcomes reported for any of the priority groups?** No	School (in school hours) **Duration of the activity/intervention** 18 weeks **Intensity of the activity/intervention** One day per week for 40 minutes **What treatment/intervention did the control/comparison group receive?** Treatment as usual: 'regularly scheduled general music classes' (p.iv)
Gromko (2005) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'The purpose of this study was to determine whether music instruction was related to significant gains in the development of young children's phonemic awareness, particularly in their phoneme-segmentation fluency.' (abstract) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills *Phonemic awareness skills* **Which methods were used to collect the data?** *LNF, PSF, and NMF subtests of the Dynamic*	**In which country/countries was the study conducted?** USA **Number of participants** Details *43 intervention, 60 control (103 total)* **Age of participants** 0-5 years **Type of educational institution attended** kindergarten at an elementary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): Music instruction involving singing, body percussion/kinaesthetic movement, playing instruments **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** *4 months*

Item	Study	Sample	Activity/Intervention
	Indicators of Basic Early Literacy Skills (DIBELS) test		**Intensity of the activity/intervention** *Once a week for 30 minutes* **What treatment/intervention did the control/comparison group receive?** No treatment
Gromko and Poorman (1998) Overall weight of evidence: Medium	**What are the broad aims of the study?** The purpose of this study is to investigate the effect of music training on preschoolers' performance IQ using 5 spatial-temporal tasks. **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Cognitive performance **Which methods were used to collect the data?** WPPSI-R (Wechsler Preschool and primary intelligence scale- revised)	**In which country/countries was the study conducted?** USA **Number of participants** 34 (17 treatment, 17 control) at recruitment 4 dropped out so 30 in study **Age of participants** 0-5 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Not stated **Any other important features of the participants** Our subjects were drawn from a private Montessori school where all children learn with an intellectually stimulating environment, receive a 'traditional' music class. ...and benefit from outside activities provided by their parents. **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Arts participation** Arts (multi-component): Children a) sang the new song several times, b) accompanied the singing with body percussion that 'painted' the melody in the air, c) took turns playing the simplified version of the song on songbells or handchimes, d) made a picture of the song using round stickers on paper, e) followed a tactile touch chart that outlined the contour of the song.' Two familiar songs were danced and sung. Every family purchased a 20 note set of songbells ... and kept at home for practice. (p.176) **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** 24 Tuesdays **Intensity of the activity/intervention** 1/2 hour, once a week **What treatment/intervention did the**

Item	Study	Sample	Activity/Intervention
			control/comparison group receive? Not stated
Hui and Lau (2006) Overall weight of evidence: Medium	**What are the broad aims of the study?** To examine 'the effect of drama education on the psychological development of grades 1 and 4 students.' (abstract) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Transferable skills: *1. Communicative-expressive ability* Creativity: *1.Thinking and drawing* **Which methods were used to collect the data?** 1. Form A of the Wallach-Kogan creativity tests (WKCT) 2. Tests for creative thinking-drawing production (TCT-DP) 3. A story-telling test (STT) was designed and used to measure students' communicative-expressive ability. 4. Observation/video-taping	**In which country/countries was the study conducted?** Asia **Number of participants** It is reported that a total of 126 children were assigned to the experimental group and the control group included 69 children (p.35). However, Table 1 on p.37 suggests that only 61 (intervention) and 67 (control) actually took part. **Age of participants** 6-10 years **Type of educational institution attended** Primary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): drama project involving puppet making and creative drama (improvisation and story creation) (p.36) **What is/are the setting(s) of the activity/intervention?** School-based extra-curricular clubs **Duration of the activity/intervention** 16 weeks **Intensity of the activity/intervention** One day each week **What treatment/intervention did the control/comparison group receive?** Alternative intervention: 'non-aesthetic extra-curricular activities, such as ball playing' (p.36)
Kendall et al. (2008) Linked reports: Eames et al. (2006); Kendall	**What are the broad aims of the study?** 'The main aim of this report is to explore the relationship between taking part in Creative Partnerships activities, or attending a school which took part in the Creative Partnerships	**In which country/countries was the study conducted?** UK **Number of participants** Number of young people in the analysis (Table	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?**

Item	Study	Sample	Activity/Intervention
et al. (2008); Sharp et al. (2006a); Sharp et al. (2006b) Overall weight of evidence: Medium/High	initiative, and academic attainment.' (p.8) **What was the design of the evaluation?** Well-matched comparison group study (Maryland Scale 4) **What learning outcomes does the study measure/report?** Academic achievement/skills *Key Stage 2 and 3 assessments* *GCSEs* **If academic achievement is measured, what subjects does the study focus on?** Literacy Numeracy Science **Which methods were used to collect the data?** 1. National Pupil Database (NPD) data 2. Attendance data collected during the national evaluation	A1, p.29) Key stage 2: 8,670* 12,102** 1,005,105*** Key stage 3: 6,493* 24,883** 1,104,907*** Key stage 4: 5,188* 23,921** 1,081,248*** * Young people known to have attended Creative Partnership activities **All young people in schools involved with Creative Partnerships in Phase 1 ***All young people nationally Number of schools in the analysis (Table A2, p.30) Key stage 2: 158* 14,126** Key stage 3: 73* 3,053** Key stage 4: 73* 3,034** *Schools involved with Phase 1 of Creative Partnerships **All schools nationally **Age of participants** 6-10 years 11-15 years 16-18 years **Type of educational institution attended** Primary school Secondary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** Unclear/low SES (intervention was targeted at 'disadvantaged communities')	Yes: Creative Partnerships **Arts attendance and participation** Arts (multi-component): The programme supports innovative, long-term partnerships between schools and creative professionals including artists, performers, architects, multimedia developers and scientists. **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** Not stated **Intensity of the activity/intervention** Not stated **What treatment/intervention did the control/comparison group receive?** No treatment: The models effectively compared the progress of three mutually exclusive groups of young people: • those known to have attended Creative Partnerships activities • those in Creative Partnerships schools, but not known to have attended Creative Partnerships activities • those in non-Creative Partnerships schools.

Item	Study	Sample	Activity/Intervention
Kim et al. (2008) Overall weight of evidence: Medium/High	**What are the broad aims of the study?** 'to investigate the effects of improvisational music therapy on joint attention behaviours in pre-school children with autism.' (Abstract) **What was the design of the evaluation?** Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** *1. Joint attention skills* *2. Pro-social behaviours* **Which methods were used to collect the data?** 1. PDDBI (Pervasive Developmental Disorder Behaviour Inventory) 2. ESCS (a structured toy play assessment measuring non-verbal social communication skills) 3. Video	**In which country/countries was the study conducted?** Asia **Number of participants** 15 at recruitment 10 in final study **Age of participants** 0-5 years **Type of educational institution attended** Not stated **Sex of participants** Male **Any other important features of the participants** Participants had autism. Those that remained after drop-out were all boys. **Are outcomes reported for any of the priority groups?** Limiting disability (children with autism)	**Which sectors does the engagement relate to?** Arts **Arts participation** Arts (multi-component): improvisational music therapy **Duration of the activity/intervention** 'Due to holidays and sick leave, it took the participants between 7 and 8 months to complete the 24 session program.' (pp.1759-60) **Intensity of the activity/intervention** Weekly, 30 minute sessions **What treatment/intervention did the control/comparison group receive?** Treatment as usual: play session with toys
Krahe and Knappert (2009) Overall weight of evidence: Medium	**What are the broad aims of the study?** To examine the efficacy of an intervention targeting first and second graders ... the first test of the efficacy of a theatre play called (No) Child's Play in promoting children's self-protective skills in terms of the understanding of situations potentially leading to abuse and in recognising appropriate behavioural responses in interactions with adults. (p.322) **What was the design of the evaluation?**	**In which country/countries was the study conducted?** Europe **Number of participants** 'A total of 148 first and second graders (78 girls; average age 7.55 years ... range 6.1–9.1 years) participated in the study ... In total, there were 44 participants in the LIVE group, 55 participants in the DVD group and 49 in the control group.' (p.323)	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: (No) Child's Play **Arts attendance** Theatre-based intervention (i.e. live performance of a play) to prevent sexual

Item	Study	Sample	Activity/Intervention
	Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** Transferable skills: *1. Self-protective skills* **Which methods were used to collect the data?** Eight short scenarios were developed to measure gains in self-protective skills. The scenarios were followed by questions (answered by students) with four-point rating scale. (pp.324-5)	**Age of participants** 6-10 years **Type of educational institution attended** Primary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	abuse **What is/are the setting(s) of the activity/intervention?** Arts setting: theatre **Duration of the activity/intervention** One day or less **Intensity of the activity/intervention** Once **What treatment/intervention did the control/comparison group receive?** No treatment
McMahon et al. (2003) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'This study evaluates the effectiveness of an arts-based educational program, Basic Reading Through Dance.' (Abstract) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills **If academic achievement is measured, what subjects does the study focus on?** Literacy **Which methods were used to collect the data?** 1. Read America's PhonoGraphix Test	**In which country/countries was the study conducted?** USA **Number of participants** 721 first-grade students participated in the study. 'At post-test, 630 students were assessed, with 293 in the experimental group and 337 in the control group.' (p.111) **Age of participants** 6-10 years **Type of educational institution attended** Primary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?**	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: Basic Reading Through Dance programme **Arts participation** Dance programme 'targeted specifically at improving basic reading skills in the areas of decoding and phoneme-grapheme relationships.' (p.110) **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention**

Item	Study	Sample	Activity/Intervention
	2. Code Knowledge 3. Phoneme Segmentation	BME, low SES (participants came from schools that served predominantly African American populations from poverty-level families)	10 weeks **Intensity of the activity/intervention** 40 minute sessions, twice a week (students were exposed to a total of 13.3 hours of dance-based reading instruction, p.112) **What treatment/intervention did the control/comparison group receive?** Treatment as usual: usual reading instruction
Merrell (2005) Overall weight of evidence: Medium	**What are the broad aims of the study?** The purpose of this study is to test the hypothesis that drama related to bullying improves the bystander's response to bullying situations **What was the design of the evaluation?** Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** Transferable skills *1. Actual reporting of bullying* *2. Direct intervention in bullying situations* *3. Attitudes about bullying* **Which methods were used to collect the data?** 1. Pre-Intervention Bullying Questionnaire Format A 2. Post-Intervention Bullying Questionnaire Format B 3. Reflection cards	**In which country/countries was the study conducted?** USA **Number of participants** Experimental (n=30) and control (n=30) groups. After the study began, one subject in experimental group was temporarily suspended, and three in the control group decided not to participate. Therefore, a total of 56 ninth graders (29 in intervention, 27 in control) were included. (p.81) **Age of participants** 11-15 years **Type of educational institution attended** Secondary school **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** BME (large proportion of sample)	**Which sectors does the engagement relate to?** Art **Does the activity/intervention have a formal name?** Yes: The 5 W's of Bullying Intervention **Arts participation** Arts (multi-component): Drama-based social-skills programme **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** Unclear **Intensity of the activity/intervention** 7 sessions at 45 minutes **What treatment/intervention did the control/comparison group receive?** Treatment as usual: 'The control group completed seven sessions of the regular Freshman Seminars, a

Item	Study	Sample	Activity/Intervention
			programme focused on high school credits, careers and study skills given to all nine graders in the school.' (abstract)
Orsmond and Miller (1999) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'This study investigated the effects of early music instruction on music perception skills as well as specific areas of cognitive development (non-verbal/spatial abilities).' (abstract) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Cognitive performance: *A variety of cognitive measures (receptive vocabulary, visual-motor integration, an embedded figures task, and puzzles)* **Which methods were used to collect the data?** Questionnaire given to parents which collected background information Tests to measure cognitive skills (see pp.22-23 for further details): 1. Peabody Picture Vocabulary Test - Revised (PPVT) 2. Development Test of visual-motor integration, Third Revision (VMI) 3. 20 picture puzzles modelled after the Puzzle-Solving subtest of the McCarthy Scales of Children's Abilities	**In which country/countries was the study conducted?** USA **Number of participants** *29 intervention, 29 control (58 total)* **Age of participants** 0-5 years 6-10 years *Range: 3 years 8 months to 6 years 8 months* **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: Suzuki music instruction **Arts participation** Suzuki music instruction: i.e., instrument lessons (types of instrument not detailed) **What is/are the setting(s) of the activity/intervention?** Arts setting: (private) music centres (no further details) **Duration of the activity/intervention** Children were tested after 4 months of music lessons. **Intensity of the activity/intervention** Not stated **What treatment/intervention did the control/comparison group receive?** No treatment

Item	Study	Sample	Activity/Intervention
	4. Preschool Embedded Figures Test (PEFT)		
Piro and Ortiz (2009) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'The major aim of this quasi-experimental study was to examine the effects of a scaffolded music instruction program on the vocabulary and verbal sequencing skills of two cohorts of second-grade students.' (abstract) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills *Vocabulary and verbal sequencing skills* **Which methods were used to collect the data?** Students were administered two subtests of the Meeker Structure of Intellect (SOI) – Form L. The first subtest used was Vocabulary. The second subtest was Verbal Sequencing.	**In which country/countries was the study conducted?** USA **Number of participants** 46 intervention, 57 control **Age of participants** 6-10 years: *2nd grade* **Type of educational institution attended** 'Participants in both treatment and control groups attended two large public elementary schools found in the same middle-class area of New York City.' (p.5) **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Music training (keyboard lessons) as a part of the general school curriculum. The 'scaffolded' music instruction was delivered parallel with the school's balanced literacy programme, which included daily lessons in reading, writing, speaking, and listening. **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** All participants were individually pre- and post-tested at the start and close of a standard 10-month school year. Participants had taken part in activities for 3 consecutive years. **Intensity of the activity/intervention** Twice a week (for periods of 40-45 minutes) **What treatment/intervention did the control/comparison group receive?** No treatment
Rauscher et al.	**What are the broad aims of the study?**	**In which country/countries was the study**	**Which sectors does the engagement relate**

Item	Study	Sample	Activity/Intervention
(1997) Overall weight of evidence: Medium	To examine whether musical learning improves long-term spatial temporal reasoning ability in early years children. (pp.2-3) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Cognitive performance **Which methods were used to collect the data?** Object assembly task of the Wechsler preschool and primary scale of intelligence-revised (WPPPSI-R)	**conducted?** USA **Number of participants** 111 initially recruited, 33 children withdrew from pre-schools during the course of the study leaving 78 34 keyboard group 10 singing group 20 computer group no lessons = 14 **Age of participants** 0-5 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Are outcomes reported for any of the priority groups?** No	**to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** 1. Learning/playing a musical instrument *(keyboard instruction)* 2. Singing lessons **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** 6 months (SA school) 8 months (LB and WC schools) **Intensity of the activity/intervention** Keyboard: once a week (LB and WC schools) twice a week (SA school) Singing: 5 days a week (p.3) **What treatment/intervention did the control/comparison group receive?** Treatment as usual: no lessons
Rauscher and Zupan (2000) Overall weight of evidence: Medium	**What are the broad aims of the study?** The purpose of this study was to determine the effects of classroom music instruction featuring the keyboard on the spatial-temporal reasoning of kindergarten children **What was the design of the evaluation?**	**In which country/countries was the study conducted?** USA **Number of participants** 62 keyboard n=34	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?**

Item	Study	Sample	Activity/Intervention
	Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Cognitive performance **Which methods were used to collect the data?** Spatial-temporal tasks involving (a) puzzle solving; (b) block building; (c) pictorial memory	no music n=28 **Age of participants** 0-5 years 6-10 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Any other important features of the participants** Mixed ethnicity **Are outcomes reported for any of the priority groups?** No	No **Arts participation** Play a musical instrument *(keyboard instruction)* **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** Unclear **Intensity of the activity/intervention** Twice a week, 20 minutes **What treatment/intervention did the control/comparison group receive?** No treatment
Register (2004) Linked report: Register (2003) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'to examine the effects of a music therapy program designed to teach reading skills on the early literacy behaviours of Kindergarten children from a low socioeconomic background' (p. 7) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills **If academic achievement is measured, what subjects does the study focus on?** Literacy	**In which country/countries was the study conducted?** USA **Number of participants** 86 participants **Age of participants** 6-10 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Any other important features of the participants** Subjects were enrolled in one of four different	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): Music therapy designed to teach reading skills. It involved singing, playing instruments and movement (pp.2,13) **What is/are the setting(s) of the activity/intervention?** School (in school hours)

Item	Study	Sample	Activity/Intervention
	Which methods were used to collect the data? 1. Pre- and post-study survey of teachers' perceptions of classroom literacy behaviours. (p.2) 2. Parent provided information on their children via a survey (pp.6-7) 3. Letter Naming and Initial Sounds Fluency subscales of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) test 4. Total raw score of the Test of Early Reading Ability-3rd edition (TERA-3). (p.14)	kindergarten classes at a public elementary school in Northwest Florida. Each class was assigned one of four treatment conditions: Music/Video (sequential presentation of each condition), Music-Only, Video-Only and 'no contact' control group. (p.2) Children were from a low SES background. (p.2) **Are outcomes reported for any of the priority groups?** Low SES (intervention targeted at this group)	**Duration of the activity/intervention** The study occurred between September and November of the school year (subjects had to attend a minimum of 15 treatment sessions). **Intensity of the activity/intervention** 1-2 per week (assumed): Groups lasted 25-30 minutes each (pp.9,13) **What treatment/intervention did the control/comparison group receive?** No treatment: There were four groups in total, one of which was a 'no contact' control group.
Schellenberg (2004) Overall weight of evidence: Medium/High	**What are the broad aims of the study?** 'The present experiment provided a direct test of the hypothesis that music lessons enhance IQ.' (p.512) **What was the design of the evaluation?** Randomised controlled trial (Maryland Scale 5) **What learning outcomes does the study measure/report?** Academic achievement/skills Transferable skills Cognitive performance **If academic achievement is measured, what subjects does the study focus on?** Literacy Numeracy **Which methods were used to collect the data?**	**In which country/countries was the study conducted?** Canada **Number of participants** 144 started (36 in each group), but 12 dropped out (keyboard: 6, voice: 4, drama: 2). Thus, analyses of pre- to post-lessons changes included data from 132 children. (p.512) **Age of participants** 6-10 years **Sex of participants** Mixed sex **Any other important features of the participants** The study was designed as follows: 2 intervention groups (keyboard lessons, voice lessons); 2 control groups (dance lessons, no lessons). However, in this review, drama	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: Kodaly voice lessons No: keyboard lessons, drama lessons **Arts participation** 1. Singing (*Kodaly voice lessons)* 2. Play a musical instrument (*keyboard lessons)* 3. Rehearse or perform play/drama *(drama lessons)* **What is/are the setting(s) of the activity/intervention?** Music conservatory **Duration of the activity/intervention**

Item	Study	Sample	Activity/Intervention
	1. Parent Rating Scale of the Behavioral Assessment System for Children (BASC) 2. Kaufman Test of Educational Achievement (K-TEA) 3. Wechsler Intelligence Scale for Children–Third Edition (WISC-III)	lessons have also been compared with the 'no lessons' control group. **Are outcomes reported for any of the priority groups?** No	36 weeks **Intensity of the activity/intervention** 1-2 per week **What treatment/intervention did the control/comparison group receive?** Treatment as usual: no lessons
Standley and Hughes (1997) Overall weight of evidence: Medium	**What are the broad aims of the study?** This study evaluated the effects of music sessions designed to enhance pre-reading and writing skills of children aged 4-5 years **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Academic achievement/skills **If academic achievement is measured, what subjects does the study focus on?** Literacy **Which methods were used to collect the data?** 1. A Print Awareness Test for Logos 2. A Print Concept Checklist 3. The Developmental Writing and Language Skills Checklist	**In which country/countries was the study conducted?** USA **Number of participants** 32 from 2 existing classes (17, 15), after matching, 24 completed the programme (12 participants eligible in each group) (p.80) **Age of participants** 0-5 years **Type of educational institution attended** Pre-school/nursery/kindergarten **Sex of participants** Mixed sex **Any other important features of the participants** The pre-kindergarten Early Intervention Program in Florida is primarily targeted at four-year old children who are economically disadvantaged. In each group (n=12), 11 of the children were of African-American origin and one of Caucasian origin. (p.90)	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Arts (multi-component): Music lessons designed to enhance pre-reading and -writing skills of children 3-5 years. They involved movement to music, playing instruments, singing songs, drawing and illustration, counting and reading. **What is/are the setting(s) of the activity/intervention?** School (in school hours) **Duration of the activity/intervention** 7.5 weeks **Intensity of the activity/intervention** 1-2 per week: 2 x 30 minutes sessions (a total of 15 sessions) **What treatment/intervention did the**

Item	Study	Sample	Activity/Intervention
		Are outcomes reported for any of the priority groups? BME, low SES, limiting disability (intervention targeted at these groups)	**control/comparison group receive?** Treatment as usual: 'The control condition was instruction in the regular prekindergarten curriculum without music involvement.' (Abstract)
von Rossberg-Gempton et al. (1999) Linked report: von Rossberg-Gempton (1998) Overall weight of evidence: Medium	**What are the broad aims of the study?** 'The purpose of this study was to examine the potentiality of creative dance to enhance physical and cognitive functioning in seniors and young children in a rural setting.' (p.235) **What was the design of the evaluation?** Unmatched comparison group study (Maryland Scale 3) **What learning outcomes does the study measure/report?** Transferable skills: *1. Social skills* *2. Affective skills* Cognitive performance: *1. Cognitive abilities* **Which methods were used to collect the data?** 1. The Cratty Self-Concept Scale 2. The 'happy/sad' faces scale (see linked report, pp.53, 63) 3. Questionnaire 4. WAIS-R and WISC-R intelligence tests 5. For children, the Bruininks-Oseretsky Test of Motor Proficiency was used *(not relevant for this review)*	**In which country/countries was the study conducted?** Canada **Number of participants** A total of 78 people participated, 24 older adults and 53 children. The number of original participants (before dropout) was 89. **Age of participants** 6-10 years 19+ years *(older adults – not focus of this review)* **Type of educational institution attended** Primary school **Sex of participants** Mixed sex **Any other important features of the participants** 'The children's groups were composed of heterogeneous class distribution of special needs, bright and average children.' (p.239) **Are outcomes reported for any of the priority groups?** No	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** No **Arts participation** Creative dance programme **What is/are the setting(s) of the activity/intervention?** School (in school hours) Residential home for the elderly (not focus of this review) **Duration of the activity/intervention** 12 weeks **Intensity of the activity/intervention** 30 minutes, twice a week **What treatment/intervention did the control/comparison group receive?** Alternative intervention: Children in a 'wait list' condition participated for 12 weeks in physical education (PE) activities such as stretching, skipping and participating in co-operative physical games.

Item	Study	Sample	Activity/Intervention
Wright et al. (2006) Linked report: Wright et al. (2007) Overall weight of evidence: Medium/High	**What are the broad aims of the study?** 'to evaluate a community-based afterschool arts programs (combination of theatre, visual, and media arts) targeted to a low-income population. Of particular interest were whether participants would demonstrate regular and sustained attendance and whether the program would have an impact on their psychosocial functioning.' (p. 187) **What was the design of the evaluation?** Well matched comparison group study (Maryland Scale 4) **What learning outcomes does the study measure/report?** Truancy rates/behaviour problems: *1.conduct* *2.pro-social behaviour* **Which methods were used to collect the data?** 1. National Longitudinal Survey of Children and Youth (NLSCY) 2. Teacher observations of students and rating them on 6 assessments 3. PMK (person most knowledgeable) typically the mother, completed questionnaires on socio-demographic information and scales to assess family functioning	**In which country/countries was the study conducted?** Canada **Number of participants** 183 **Age of participants** 6-10 years (at baseline) The programme itself was for 9-15 year olds; participants were followed up every two years. **Sex of participants** Mixed sex **Any other important features of the participants** Data on the participants is taken from a longitudinal study. This survey constituted the data collection for the NAYDP (research that evaluates community-based, youth arts programmes in low-income communities). Five sites were selected for the implementation (and evaluation) of the arts programme. Therefore, the participants are from a range of 5 different sites. The population reflects an 'ethnically and culturally rich' cross-section of the Canadian population. **Are outcomes reported for any of the priority groups?** Low SES (intervention targeted at this group)	**Which sectors does the engagement relate to?** Arts **Does the activity/intervention have a formal name?** Yes: National Arts and Youth Demonstration Project (NAYDP) **Arts participation** Arts (multi-component): Combination of theatre, visual and media arts **What is/are the setting(s) of the activity/intervention?** Unclear **Duration of the activity/intervention** 6 months (and 1 day) to 1 year **Intensity of the activity/intervention** 90 minutes, twice a week **What treatment/intervention did the control/comparison group receive?** No treatment